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Successful Strategies for Implementing Health Information Technology in Primary Care Practice

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Practice

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MBA, Dowling College, 2015

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Health information technology (HIT) owner-practitioners who adopt effective strategies for HIT implementation can improve primary facility care delivery and profitability. However, some HIT owner-practitioners have ineffective implementation strategies, so they have not realized the total revenue increases of more than 8%. Grounded in general systems theory, the purpose of this multiple case study was to explore successful strategies primary care practitioners (PCPs) use to implement HIT to improve primary facility care delivery and profitability. The participants included 6 owner-practitioners located in Queens County, NY, who successfully implemented HIT to improve facility care delivery and profitability. Data were collected through face-to-face interviews and a review of relevant practice documents. Data were analyzed using thematic analysis, yielding 3 themes: HIT education and training, costs of transitioning to HIT, and focusing on expected benefits of successful HIT implementation. By providing information on effective HIT strategies, the findings from this study could impact social change because PCPs may rely on faster and more accurate health information data to offer better diagnoses and enhance treatments for patients.

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Dedication

I would like to dedicate this study to my dad, J.B. Otoo, and my wife, Salomey

Otoo, for their motivation and support throughout this journey. For my little Lillian, I say

thank you and may God richly bless you for being a good girl.

Acknowledgment

I thank the almighty God for granting me strength, knowledge, and courage to take on this challenging but yet fulfilling journey. I would not have come this far without your protection, God, may your name be praised. Exceptional gratitude goes out to Dr. Warren Lesser, my committee chair for his continuous and selfless support, guidance, expert advice, and clear directions throughout this journey. Dr. Warren, I cannot thank you enough. May the blessings of God be your portion. To my second committee member, Dr. Orlando Rivero, I thank you for your suggestions and guidance throughout the process of this doctoral study. To my URR, Dr. Cheryl Lentz, I say thank you for your indispensable feedback. I appreciate your efforts and recognize the impact of your recommendations on this study. Finally, I am grateful to the Very Rev. Joseph Osei-Amankwah of Wesley Methodist Church Brooklyn for his moral, emotional, and spiritual support.

Table of Contents

List of Tables

Section 1: Foundation of the Study

The advancement of health information technology (HIT) continues to reform the delivery of health care for quality and efficiency. Leaders implement HIT to streamline processes, reduce service delays, limit fraud, and eliminate unnecessary errors made by some health care professionals in the discharge of their duties. Thus, HIT positively affects health care performance through reduced waste and increased profitability (Brunt & Bowblis, 2014). However, HIT adoption rates among primary care practitioners (PCPs) is low (Brunt & Bowblis, 2014). The objective of this qualitative multiple case study was to explore successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability.

Background of the Problem

HIT has been a significant part of health care improvement and efficiency (McCullough, Parente, & Town, 2016). PCPs may reduce the mortality rate and increase survival of high-risk patients through enhanced monitoring after HIT implementation such as patients with pneumonia (McCullough et al., 2016). Additionally, HIT provides one potential avenue to improve both conformance and experiential quality successfully (Sharma, Chandrasekaran, Boyer, & McDermott, 2016). HIT adoption by health care practitioners can also improve care cost-efficiency through waste avoidance by supporting the delivery of accurate and timely health care to all patients (Hu et al., 2015).

Regarding cost efficiency, researchers suggest that opening visit notes to patients through HIT adoption improves communication and helps patients become more actively

involved in their health and care (Sensmeier, 2016). Adopting HIT serves as information access and exchange tools necessary to achieve optimal care and patient safety coordination (Sensmeier, 2014). With the increased implementation and use of HIT, health care managers can improve care, data standardization, and continue to reduce cost (Verdon, 2015). Patients may benefit from their own self-management of diabetes through the adoption of HIT (Or & Tao, 2014).

Although researchers have studied the usability of HIT interventions, the reason for not using specific behavioral theories remains unclear (Brunt & Bowblis, 2014; Payne et al., 2016; Sawesi, 2016). Most practitioners find the use of HIT features difficult; however, the continued support for HIT is because of the benefits, features, and facilities (Sawesi, 2016). Further, to be a standard in the field of the health care system, the effectiveness of HIT interventions can be measured based on factors such as (a) motivation for health behavior change, (b) long-standing adherence, (c) expenditure, (d) satisfaction, and (e) health outcomes (Sawesi, 2016). Additionally, it is important that the application of HIT leads to primary health care systems that are more accessible and user friendly. PCPs who use HIT platforms can enhance patient engagement and improve health outcomes because patients become more empowered in addressing their own health concerns (Sawesi, 2016). Patients empowered by information access are more trusting of their PCP and the broader health care system. This background prompted my interest to investigate successful strategies primary health care practitioners use to implement HIT to improve primary facility care delivery and profitability.

Problem Statement

The 21st century adoption and use of HIT had a dramatic impact on the practice of primary medicine (Payne et al., 2016). Following successful adoption of HIT, primary care facilities have increased total revenue more than an 8% and improved patient outcomes (Lee & Choi, 2016). Nevertheless, some PCPs do not experience the benefits of HIT adoption because of ineffective implementation strategies and guidelines. The general business problem is that the adoption of HIT among primary care practices is slow and challenging. The specific business problem is that some PCPs lack successful strategies to implement HIT to improve primary facility care delivery and profitability.

Purpose Statement

The purpose of this qualitative multiple case study was to explore successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability. The target population comprised PCPs from six primary care facilities successfully using HIT for daily health care delivery in Queens County, New York. For the HIT implementation to be considered successful, the PCPs must have (a) confirmed a postimplementation revenue increase of 8% within two calendar years, and (b) improved year-over-year patient satisfaction measures. The implication for positive social change is that successfully implementing HIT could improve primary health care delivery and facility profitability. Improved primary facility health delivery can include streamlined patient processes, improved diagnoses efficacy, faster and more consistent assessment protocols, consistent record keeping, improved patient registration, facilitated patient

record transfer, and immediate access to patient medical records during treatment continuation. Improved facility revenue includes an increase of 8% or more within 2 years of a successful HIT implementation. Finally, the findings could enable PCPs to improve patient care by addressing HIT implementation deficiencies.

Nature of the Study

To address the purpose of the study, I chose a qualitative research method. Qualitative researchers discover common themes from detailed experiences by identifying the intentions and actions of people (Yin, 2017). To provide insights into the setting of a problem, qualitative researchers facilitate deep understanding of a phenomenon through observation, exploration, and interpretation (Park & Park, 2016). Further, a qualitative approach was appropriate because I did not examine or numerically measure variables' relationships or differences.

In this study, I chose the multiple case study design to understand, explore, and report pragmatic, successful HIT implementation strategies by PCPs. A multiple case study requires understanding the complexity of an individual case (Park & Park, 2016). Further, the individual case involves a bounded system investigation of a subject deemed worthy of analysis (Park & Park, 2016). Using a multiple case study design can help to understand and report the uniqueness of individual cases through (a) interviews to gather narrative and testimony; (b) watching to gather observations; (c) searching the germane written records and artifacts; and (d) exploring the conceptual structure, looking for data

patterns, consistencies, repetitions, and manifestations pertinent to each research question (Park & Park, 2016).

In contrast to multiple case study design, ethnographic researchers focus on studying an entire culture of individuals to gain perspectives of their experiences (Mannay, & Morgan, 2015). I did not intend to study HIT implementation in a cultural group, making an ethnographic design inappropriate. Further, the primary goal of phenomenological researchers is to study the human life experience from the view of those living the phenomenon (Dowden, Gunby, Warren, & Boston, 2014). In contrast, I gathered information about the successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability. Hence, a phenomenological gathering of information related to participant's human life experiences would not have yielded the data to determine successful strategies.

Research Question

What successful strategies do PCPs use to implement HIT to improve primary facility care delivery and profitability?

Interview Questions

1. What successful strategies have you used to implement HIT to improve primary facility care delivery and profitability?

2. How did you arrive at these strategies?

3. What challenges did you encounter?

4. How did you overcome these challenges?

5. How did you assess and measure the effectiveness of your HIT implementation strategies?

6. Based on your experience, what training or policy influenced your implementation process of these successful strategies?

7. How did you handle and influence internal user and patient acceptability?

8. Based on your experiences and analysis, what contributed to the success of these strategies?

9. How did you handle and measure pre- and post-implementation efficiency improvement(s)?

10. What additional information can you share to help others understand the successful strategies your organization employed to adopt your HIT?

Conceptual Framework

To provide a conceptual framework for this study, I employed the general systems theory. Systems theory indicates the structure and properties of systems in terms of relationships from which new properties of wholes emerge. Ludwig von Bertalanffy introduced general systems theory in 1937; the inspiration behind systems theory is the idea of a system's entirety (von Bertalanffy, 1972). Von Bertalanffy (1972) defined a general system as any theoretical scheme of interest to more than one element. Systems have differentiation and specialization; for example, the parts made up of elements may specialize to accomplish particular functions like boundary maintenance, input or output

regulation, and decision-making. Systems theory provides an internally consistent framework for classifying and evaluating the world (von Bertalanffy, 1972).

I selected general systems theory as the appropriate framework to explore the complex systems within a primary care facility and to provide strategies for successful HIT implementation. Viewing the phenomenon through systems theory could help to explore perceptions of interactive strategies of PCPs to the whole concept of HIT implementation. Implementing HIT can enhance organizations ability to increase profitability (Ghobakhoo & Tang, 2014). The general systems theory provided a framework for the exploration of successful strategies for implementing HIT in primary care practice.

Operational Definitions

Health information technology (HIT). HIT is a data-driven computer system used by health care professionals and patients to process and share patient-related data, information, or knowledge (Pinsonneault et al., 2017).

Primary care practice. A primary care practice is the first point of access to health care outside of hospitals and involves (a) general practice surgeries, (b) a central point for care continuity, and (c) facilitates and anticipates interactions between a diverse range of health care providers (McLeod & Simpson, 2017).

Primary care practitioner (PCP). Health care provider with a focus as the mainstay of diagnoses, crucial preventive and curative services, and possible referral to specialist (Galea & Kruk, 2019).

Successful HIT implementation. Operating a functional (meaningful use) HIT system with little or no error and an increase of 8% or more within 2 years of HIT implementation (Yen, McAlearney, Sieck, Hefner, & Huerta, 2017).

Assumptions, Limitations, and Delimitations

Assumptions

Study assumptions are unverified facts considered to be true but are necessary for the research problem (Leedy & Ormrod, 2015). For example, one of the assumptions of this study was that a researcher must achieve data saturation and involve three or more participants (see Krueger & Casey, 2014). Second, I assumed that each participant would understand the interview questions and answer truthfully. Third, I assumed that having successfully implemented and used HIT in primary care practice, each participant would provide relevant, important, and substantive information.

Limitations

Limitations of a study are potential weaknesses out of the researcher's control that may restrict the intended scope or purpose of the study (Marshall & Rossman, 2016). The fundamental limitation of qualitative case studies is the small sample size of participants (Yin, 2017). The potential participants' bias and ability to answer questions genuinely may also affect the quality of the research (Saunders, Lewis, & Thornhill, 2016). Further, one limitation was that participants may be uncomfortable answering specific questions or hesitate to provide detailed competitive information.

Delimitations

Delimitations are factors that limit the scope and define the boundaries of a study (Yin, 2017). Delimitations may include geographical location, chosen population, sample size, and the research questions (Yin, 2017). The scope of this study was delimited to PCPs who successfully implemented and utilized HIT in Queens, New York. Therefore, the research outcomes of this study may not be generalizable to physician specialties or other geographical locations. Additionally, participants were PCPs who successfully implemented HIT to improve primary facility care delivery and profitability.

Significance of the Study

Contribution to Business Practice

Adoption of HIT by health care practitioners may improve care cost-efficiency through (a) waste avoidance and (b) supporting the delivery of accurate and timely health care to all patients (Hu, Ong, Zhu, Liu, & Song, 2015). Thus, health care practitioners' adoption of HIT may create opportunities to improve care delivery, reduce preventable medical errors, decrease cost, and increase efficiency and profitability. Study outcomes may show PCPs and small practice owners effective strategies to facilitate successful HIT implementation for improved care delivery and increased profits. As sources of information, and as means to bolster communication accuracy, health organization information systems, public health surveillance data, strategic needs assessments, and bioinformatics evidence help administrators to improve health care (Martin & Felix-Bortolotti, 2014).

Implications for Social Change

Implementation of HIT is an important driver of quality and safety, as highlighted in a recent study of malpractice claims involving seven different hospitals (Sensmeier, 2016). Health care professionals' HIT adoption facilitates care coordination through increased responsiveness, efficiency, security, privacy, and accuracy as well as support better communication and error reduction (Sensmeier, 2014). This study's finding could contribute to positive social change by helping PCPs procure and implement necessary HIT to improve primary care delivery by reducing wastage and errors affecting the efficacy of patients' care. Additional social change includes encouraging a simplified access to medical reports and ease the flow and transfer of medical information to payers and patients. With the adoption of HIT, PCPs can rely on faster and more accurate health information data to offer better diagnoses and enhance treatments for patients.

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A Review of the Professional and Academic Literature

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Practitioners who implement HIT can make health information directly available to patients through generally accessible electronic tools such as patient portals, wearable technology, and mobile applications (Mackert, 2016). However, the direct availability of this information to patients may be complicated because of insufficient understanding of HIT privacy and information sharing (Mackert, 2016). For instance, patients with low health literacy are less likely to use HIT tools (Mackert, 2016). Furthermore, some patients consider their health information provided through HIT is private (Mackert, 2016). Given the fast-paced evolution of technology, there is a pressing need to further

the understanding of how health literacy relates to HIT application adoption. Implementation of HIT can provide better health information access to facilitate their own health management (Mackert, 2016). In this study, I investigated what strategies PCPs use to successfully implement HIT to improve primary facility care delivery and profitability. For the HIT implementation to be considered successful, the PCPs must have (a) confirmed a postimplementation revenue increase of 8% within 2 calendar years and (b) improved year-over-year patient satisfaction measures. The following literature review will support the foundation of the study.

Literature Research Strategy

In this qualitative multiple case study, the goal was to explore successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability. Therefore, this literature review includes information on the following topics: (a) related theories, (b) strategies for implementing HIT in primary care practice, (c) the classification of HIT, (d) the advantages of HIT, (e) HIT implementation failures, (f) the future of HIT, (g) HIT and the cloud, and (h) HIT and fraud. Included in this review are peer-reviewed journals articles published within 5 years of completion of the study. Article sources included Walden University's Library, EBSCO Host, ProQuest Research, Google Scholar, Business Source Complete, Emerald Insight, and Management Review. Additionally, books and selected American government publications comprised the sources of information for this literature review.

Theory of Reasoned Action/Theory of Planned Behavior

Ajzen and Fishbein (1980) developed the theory of reasoned action to estimate discrepancies between behaviors and attitudes. Previously applied to HIT adoption, the theory of reasoned action is an innovation theory influenced by the additions of different variables, including user readiness (Lai, 2017). Investigating the motives, attitudes, and intentions of a specific behavior forms a necessary base in the theory of reasoned action. Distinct variables in the theory of reasoned action include a buyer's attitudes, motivation, and subjective norms. Different variables affect a buyer's preference such as their attitudes, motivation, and subjective norms (Joshua et al., 2018). These constructs apply to choice under the theory of reasoned action.

Ajzen and Fishbein's theory helps predict the intentions of different individuals to undertake reasoned actions in their daily life action scenarios. For example, Kanowski et al. (2017) used the theory of reasoned action in their study concerning why different individuals use social media to share information. The theory of reasoned action also applies to studies on coupon usage, ethical behavior, and social commitment (Paul et al., 2016). Other applications of theory of reasoned action include in brand loyalty, behavior adoption in the usage of condoms to lower the spread of HIV/AIDS, and road safety. Researchers affirm that attitudes are highly fundamental in the theory of intended action (Alexander & Madsen, 2018; Alexander, Madsen, & Newton, 2017; Ko, Wagner, & Spetz, 2018). Relatedly, the theory of reasoned action aligns with interviewing PCPs to understand their attitudes toward the adoption of HIT.

Technology Acceptance Model

The technology acceptance model (TAM) is an essential aspect in understanding the relationship between technology and humans. The TAM encompasses considerations of human, organizational, and technological factors that obstruct the use and acceptance of HIT by health care professionals (Hsiao & Chen, 2015). Hsiao and Chen (2015) further defined the TAM as a fundamental theory of system information because it promoted the various process stages, including inculcating, acceptance, and utilization of the recent technological innovations. Thus, the TAM enables users to achieve the fundamental skills in information literacy (Hsiao & Chen, 2015). However, the acceptance of IT adoption is a psychological choice individual or organizations make regarding an IT system (Schwarz, Chin, Hirschheim, & Schwarz, 2014). This aspect is better understood through both perceived ease of use and perceived usefulness. Perceived usefulness relates to the degree to which a user believes using a system will enhance his or her job performance, whereas perceived ease of use refers to the extent to which a user believes using a particular system will be free of efforts (Falode, 2018).

The modification of the TAM has been applied to technological innovations (Werasinghe & Hindagolla, 2018). For instance, it is possible to apply the TAM to technology in social media (Althuizen, 2017). The validation and development of the TAM are fundamental to the validation and development in ensuring that different locating systems are enhanced safely (Kwee-Meier et al., 2016).

The TAM is relevant in investigating patients' acceptance among different technologies. The use of the TAM in the investigation of the health conditions of patients ensures that the technology available is properly used in enhancing health care and safety for the patients. The TAM is fundamental in analyzing the effects of technological innovation by enhancing safety for patients when the need arises. For example, the TAM is commonly used in different health care delivery processes and in measuring acceptance (Moradi & Bayat, 2018).

The TAM is also appropriate to determine how the health professionals are able to accept and utilize HIT in their practices (Agha, 2014). Information technology links productivity growth in a wide variety of sectors and HIT is a leading example of innovation with the potential to transform industry-wide productivity. Conversely, some PCPs continue to make poorer value addition to the service they provide because of the lack of HIT adoption and technological improvement (Jha & Bag, 2019). To be able to properly use technology in the health care system, there must be proper consent from the patients.

A patient's behavior about usage depends on factors or variables such as the perceived ease of use and perceived usefulness. HIT applications, if appropriately employed, can lead to perceived usefulness of HIT (Sun et al., 2018). Though factors like cultural differences cause some patients to be less inclined to HIT acceptance, perceived usefulness and perceived ease of use can be improved by identifying the long-term benefits associated with HIT (Sun et al., 2018). With HIT systems in place, patients

regardless of age or location can consult their primary care provider without visiting a facility.

The TAM is one of the strongest and most commonly used models because (a) it can assist in predicting the usage of technology; (b) offers a description of the impacts of perceived ease; and (c) can support descriptions of perceived usefulness for behavior intention, individuals' attitude, and system usage (Stei & Rossman, 2016). Therefore, the TAM is useful in explaining, examining, and predicting why some PCPs' attitudes and beliefs influence their acceptance or rejection of HIT.

Diffusion of Innovation Theory

Diffusion is a process by which innovation is transmitted among different members of a given social system through different communication channels (De Almeida et al., 2016). Additionally, diffusion can be described as the process of communication through which the aspect of an innovation (e.g., technology, program, etc.) spreads from any adoption unit to another unit in a given social system (Kee et al., 2017). For instance, strong ties are fundamental in facilitating faster flow of information on different social media platforms under specified configurations of the network (Kee et al., 2016). The diffusion of innovations also includes a fundamental decision process supported by Rogers's (1995) innovation diffusion theory (De Almeida et al., 2016). Additionally, a specific stochastic framework can be used for different innovation diffusion stages and modeling user adoption, though diffusion can be studied using the several diffusion models (Mehmood et al., 2016).

Diffusion innovation theory deals with how technology is diffused and utilized to be able to reach more patients (Lien & Jiang, 2017). To understand how different individuals translate new concepts or ideas is one use of diffusion innovation theory. Further, the diffusion innovation theory also promotes the use of high technology media with high-speed transmission characteristics in order to meet different health needs such as diabetes (Lien & Jiang, 2017). There are five different stages of the innovation diffusion process: knowledge, persuasion, decision, implementation, and confirmation (Zhai et al., 2017). Further, innovation plays an important role in transforming different research traditions (Zhai et al., 2017). Although innovation remains challenging and time-consuming, diffusion of innovations is central to promoting HIT implementation, bringing necessary progress, and staying competitive in the primary care industry.

Diffusion innovation theory applies to how different forms of innovation are now becoming the norm in improving health care. Wearable health-monitoring systems for patients are becoming popular, especially in enabling the noninvasive diagnosis of vital functions of the human body to assess health conditions (Soh, 2015). Besides typical singular heartbeat or perspiration sensors, commercially available before 2015, the deployment of a series of body-worn sensors can enable an effective health-monitoring mechanism to evaluate the conditions of patients (Soh, 2015). Factors from technology, health, and privacy perspectives impact the decision of consumers and patients to adopt health care wearable technology (Gao, 2015). Fitness device users care more about hedonic motivation, functional congruence, social influence, perceived privacy risk, and

perceived vulnerability (Gao, 2015). Medical device users pay more attention to perceived expectancy, self-efficacy, effort expectancy, and perceived severity (Gao, 2015). The information obtained from such systems and devices can also either be relayed directly to any health-monitoring personnel in the case of emergencies or can be logged and analyzed as a part of preventive health measures and will be able to facilitate faster medicinal remedies (Soh, 2015). In relation, the decision of patients to finally accept the application of HIT is because of the ability of health care and HIT providers to assure patients of efficient health care delivery and that the data of patients are also secured.

HIT can also be linked to the proper application of technology in the field of health care to provide the accessible and quality health services to the patients who are in need, which requires knowledge and skills support for user acceptability. It is important to address group, individual, and social creativity by making connection to seemingly unrelated ideas for innovation; however, this can be difficult when making connections between fields like biology and technology (Kusiak, 2016). But these ideas are fundamental in redirecting research activities and research development (Alexander et al., 2016; Bee et al., 2018). Thus, nurses and other health professionals should be equipped with sufficient knowledge and skills that support HIT.

The use of technological innovation in the field of health care is increasing (Yaeger, Shoirah, Kellner, Fifi, & Mocco, 2019). Innovation diffusion that operates at the organizational level is fundamental to technological innovation; innovation diffusion and

technological innovation are interrelated. The innovation diffusion operates in four stages: (a) knowledge, (b) persuasion, (c) decision, and (d) confirmation (Dearing & Cox 2018; Dearing et al., 2017). Patients should be equipped with knowledge on how the HIT system works for them to believe in the usefulness and effectiveness of technology in the health care field. It is important to equip patients with the necessary knowledge in HIT system functionalities and the effects on patients' acceptability and usage. For example, diffusion takes place among individuals in response to understanding or learning different aspects about an innovation (Perla et al., 2018). Diffusion is a social activation form that is likely to take place after certain information is disseminated (Perla et al., 2018; Onie et al., 2018). Thus, information ascertained through HIT should be considered as sensitive and should not be disseminated without the proper patient consent. Further, patients receive more access to health care systems and health care professionals enjoy more options on how to better coordinate and collaborate with their patients.

Strategies for Implementing Health Information Technology in Primary Care Practice

HIT includes tools necessary for running primary care facilities in the 21st century. The new applications used in HIT include cloud computing, mobility in health, e-health, telehealth, and other remote delivery of health care services (Godbole, 2015). Accountable care organization leaders and managers are learning how to use HIT systems to provide better care regarding quality and efficiency (Wu, Rundall, Shortell, & Bloom, 2016). HIT adoption is also a reliable and necessary tool to operate a primary care

practice efficiently with financial success (Wu et al., 2016). Further, HIT adoption can

help improve health care services accessibility, accuracy, reliability, and efficiency in the

primary care industry. For example, people and patients experiencing trouble accessing

health care services for reasons unrelated to their insurance statuses are more likely to

look for support using the Internet to obtain health information, including different HIT

features (Amante, 2015). Improving the accuracy and reliability of publicly available

online health information also assists patients who have trouble accessing health care

services (Amante, 2015). Therefore, PCPs need to develop strategies to enable successful

HIT implementation.

To gain the benefits of emerging technologies, it is important to make sure that

the health care system remains (a) accessible to patients, (b) empowering to patients, and

(c) a vehicle to inform patients about their personal health (Godbole, 2015). Effective use

of HIT may translate into benefits for health and well-being by helping people to manage

their own health, support healthy living, and gain access to useful information at any time

and place (Paglialonga, Lugo, & Santoro, 2018). Thus, using applications in health care

has benefits such as patient empowerment, increased patient awareness, and improved

patient–doctor communication.

Widespread use of HIT within the primary care industry can improve the quality

of health care, prevent medical errors, reduce health care costs, increase administrative

efficiencies, decrease paperwork, and expand access to affordable health care. HIT

adoption into a health facility can also result in more than 8% increase in revenue as well

as improving health care quality (Lee & Choi, 2016). Another positive impact of HIT is the ability of the hospitals to reduce waste and to maximize energy efficiency (Godbole, 2015). Replacing the IT equipment and upgrading with energy efficient systems such as virtual servers, virtual data storage, and efficient application and database structures can reduce IT power consumption for the replaced equipment by up to 40% compared to data center networks without any power saving scheme (Biswas, Ray, Sondur, Pal, & Kant, 2019). Additionally, virtual server and virtual data storage technology are methods that allow hospitals to reduce equipment and system management costs. Further, costs reduce when patients are empowered to utilize HIT in managing their health (Godbole, 2015). Therefore, the use of facilities such as HIT can create a major impact not just for the patients but also for the health care providers.

Recent advances in the adoption and use of HIT have had a dramatic impact on the practice of medicine (Payne et al., 2016). However, HIT implementation continues to be a challenge for some PCPs. Many practitioners and primary care facilities are yet to adopt HIT despite reported benefits (Lee & Choi, 2016; Payne et al., 2016). To address this, HIT-related clinical care and public health communication efforts may focus on the differential benefits accrued with e-Health usage (Kontos, 2014). Addressing the communication inequalities and persistent disparities in health outcomes has led to efficient and faster patient results (Kontos, 2014). Public health and medical practitioners use HIT to communicate with patients in both traditional and novel ways to address health concerns such as diabetes management, cancer prevention, smoking cessation, and

heart health (Kontos, 2014). Thus, innovative developments, like HIT, indicate the importance of successful technology implementations to empower the patients and improve their health.

In 2017, Rittenhouse et al. examined the correlation of HIT implementation among a national cohort of small primary care practices in the United States. Rittenhouse et al. looked to ascertain the rate of adoption and use among small PCPs over time. Studies of individual physicians indicated that primary care physicians, and particularly family physicians, are more likely than their colleagues to adopt and use HIT (Fragidis & Chatzoglou, 2018; Rittenhouse et al., 2017). Rittenhouse et al. demonstrated an increase in 16 measures of HIT adoption and use by a nationally representative cohort of 566 small primary care practices between 2007-2010 and 2012-2013. The proportion of practices that relied on paper records dropped precipitously during this period, and functionalities such as e-prescribing, e-mail with patients, and use of an electronic health record to collect clinical quality data increased substantially (Rittenhouse et al., 2017) HIT implementation, or adoption into primary care facilities, presented a different set of challenges to clinicians and management of the facility. For example, Fragidis and Chatzoglou (2018) found that commitment and involvement of top hierarchy, senior management, and leaders in the HIT implementation process was the most significant success factor. However, a lack of support from medical, nursing, and administrative staff can also cause failure of HIT implementation (Fragidis & Chatzoglou, 2018). Collectively, Fragidis and Chatzoglou and Rittenhouse et al. discovered how vital

commitment and involvement of senior management, leaders, medical, nursing, and administrative staff are to the success of HIT implementation. Users and leaders are, therefore, a more significant part of every successful HIT implementation.

Independent hospitals and small health systems face daunting challenges in developing their health care IT capabilities to meet the requirements of value-based care. Some PCPs and small practices in the United States faced financial difficulties in their attempts to cover the cost of HIT implementation (Zulman, 2015). To provide quality patient care and remain competitive in the health care industry, requires investments in HIT (Burgdorfer & Simnick, 2016). Burgdorfer and Simnick (2016) examined how independent hospitals and small health systems dealt with a lack of funds when adopting HIT.

Patients often use HIT for multiple health issues to support self-care for certain conditions that would allow to transcend disease boundaries (Zulman, 2015). Thus, the availability of mobile devices which support HIT accessibility affects health and medicine practices profoundly (Ventola, 2014). Further, the rapid integration of mobile devices and technology into clinical practice will improve the rising availability and quality of medical software applications (apps; Ventola, 2014). Per Ventola, (2014), several issues and challenges are present in the future integration of mobile devices and apps into health care practice. To ensure a fundamental level of quality and safety when using medical apps and HIT argues the development of rigorous evaluation, assessment, validation, and best practice standards (Ventola, 2014). With the implementation of

assessment measures, the main determinant of an apps' value may be provision of meaningful, accurate, and timely end user information and guidance (Ventola, 2014). The quality of HIT and apps serves the vital purpose of improving patient outcomes, thus improving the health care system (Ventola, 2014).

Independent hospitals and small health systems that cannot afford to implement their own HIT, fall behind competitors (Burgdorfer & Simnick, 2016). In meeting this challenge, some independent and small health systems elect to collaborate with larger systems that have the capital and expertise to facilitate an electronic health record rollout. The increasingly vital role HIT adoption plays in a hospital's business operations has been a significant factor (Burgdorfer & Simnick, 2016). There are several models of the ways that research and other factors can influence policy (Gold, 2009; Peterson 2017). Well-known models of the policy process begin with problem identification and describe the pathways by which evidence affects policy formulation. Therefore, PCPs and small health system leaders must carefully weigh their options and proceed cautiously in meeting the challenge of sourcing and implementing HIT.

With HIT implementation, PCPs target improvements in patient care through improved adherence to clinical guidelines, the enhanced monitoring of diseases, a reduction in medical and medication errors, and access to more accurate and complete health information. However, Doekar and Sarnikar (2016) noted that the implementation of HIT did not guarantee improvements. The adoption of HIT is a process of implementing change in an organization. Changes within an organization are usually

associated with employee psychological uncertainty about how the change will affect their lives (Nilsen, Schildmeijer, Ericsson, Seeing, & Birken, 2019). Therefore, HIT adoption being new or replacing an existing one, creates change in the organization, the work process, and employee's attitudes. Implementation can be daunting with unforeseen circumstances as HIT involves more than just the application of technology. Deokar and Sarnikar (2016) posited that the success of electronic health record implementation is dependent upon change management; electronic health record implementations require complex changes to core organizational processes. Understanding health care professionals' change responses may be critical for facilitating implementation to achieve an evidence-based practice in the rapidly changing health care environment (Nilsen et al., 2019).

The Classification of Health Information Technology

To transform into a value-based health care delivery model, leaders of the American health care delivery system focus on improving clinical quality, safety, and outcomes at the lowest and most reasonable cost possible to the consumer (Harris et al., 2017). Presently, PCPs seek new sources of competitive advantage and cost-cutting measures wherever possible. Since the passage of the Patient Protection and Affordable Care Act in 2010, health systems, hospitals, and medical groups have faced considerable public pressure to assume an increased amount of risk for the costs and outcomes of their patient population through value-based payment models (Kerrissey, Satterstrom, Leydon, Schiff, & Singer, 2017). Successful HIT implementations facilitate leaders may better

manage patient care through the secure use and sharing of patient information. When PCPs implement HIT, it can improve the quality of care and make it more cost-effective through the adoption of HIT, which makes patient information available electronically when and where needed. It is imperative for PCPs to investigate modern technology and identify areas in which HIT can help improve the quality of service for efficient patient care.

In the 21st century, health care leaders can use HIT to plan, organize, monitor, and control their businesses, regardless of their health care industry (Couchoro, 2016). HIT helps support information management and secure data to enhance patient information storage and retrieval for efficient patient care and profit maximization. Carvalho, Rocha, Vasconcelos, and Abreu (2019) posited that the increasing volume of data, is exceeded the ability of health organizations to process it for improving clinical and financial efficiencies and quality of care. Therefore, data management and analytics is critical in primary care practice. Data management includes processes and technologies to acquire, store, prepare and retrieve data for analysis. HIT as five applications popularly used in most primary care settings:

1. Electronic health record (HER)

2. E-prescribing

3. Telehealth

4. Clinician decision support

5. Secure messaging

Dorsey (2016) found that the evolving digital revolution shifted telehealth delivery from clinics to the home. Primary care practitioners leverage HIT to improve health care delivery and make health care more accessible (Dorsey, 2016). In an integrated care model involving primary care providers (PCPs) and obesity specialists, telehealth may be useful for overcoming barriers to treating childhood obesity because childhood obesity may be addressed without having the child or patient physically visit the clinic or the hospitals (Fleischman, 2016). However, the rapid growth of telehealth for health care delivery exposed the lack of training available to prepare all levels of clinicians for this modality of using technology to make health care more accessible (Papanagnou, 2015). Issues range from care coordination to legal and ethical implications to new ways of engaging patients which must be addressed to better understand and apply HIT (Papanagnou, 2015).

Villasenor (2017) noted that providers of health care with fewer years in medical practice seem to have knowledge of e-prescribing because they have access to more updated innovation system and technology. Further, Vilasenor determined that knowledge of e-prescribing corelated with health care providers using HIT to deal with their patients. Patient education and exposure to e-prescribing has the potential to decrease perceived barriers and increase perceived usefulness for acute care providers (Villasenor). Accurate knowledge databases are needed to produce relevant drug formulary alerts and encourage formulary adherence (Tolley, Slight, Husband, Watson, & Bates, 2018). The research works of Villasenor and Tolley et al. are imperative in

highlighting the benefits of e-prescription. However, medication-related clinical decision support is still relatively immature in some organizations and has substantial room for improvement.

Zadehh (2016) identified four key benefits of using HIT for e-prescribing, including (a) improving the quality of health care services, (b) increasing the efficiency and effectiveness when prescribing and dispensing medications for the patients who are in need, (c) reducing medication errors, and (d) increased health care cost savings. Failure to properly implement e-prescribing systems in the clinics can, however, also result in new types of errors that reduce workflow efficiency, increase medication cost, and threaten patient safety (Zadeh, 2016). Finally, software redesigns to improve HIT may be needed to remove barriers associated with uncertain pharmacy hours which can be inefficient for the patients, controlled substance prescribing, transmittal confirmation, and bidirectional communication needs of the patients, thereby improving motivation to e-prescribe (Villasenor, 2017).

Advantages of Health Information Technology

HIT implementation in the primary care industry has the potential to improve the health of individuals and the performance of practitioners, yield improved quality, reduce costs and paper waste while providing easy access to patient's medical records and greater engagement by patients in their health care. Management systems allow for the acquisition, storage, transmission, and display of administrative or clinical activities related to patients, such as electronic health records or electronic medical records

(Rouleau et al., 2017). Fernandez-Planelles, Jover, Palomar, and Calvo (2016) investigated the organization of health service systems as a part of their effort to achieve better preventive control and management of chronic disease treatment. To support the proper care continuity, Fernandez-Planelles et al., determined that HIT implementation was a fundamental tool which supported comprehensive care, improvement of drug treatment, and better prevention control through effective communication.

To properly administer treatment in the health care industry, the implementation of HIT helped to streamline the care process communication among clinical specialists. Communication also creates an atmosphere to promote engagement of professionals in the various evolutionary stages of a disease, improve the clinical approach, reduce the clinical variability, promote the continuity of care, reduce morbidity, and standardize registration processes to improve perceived quality and patient satisfaction (Fernandez-Planelles et al., 2016). Significant increases in IT spending in recent years has generated great interest in its effects on the health care industry cost structure, health-care quality and patient privacy (Haried, Claybaugh, & Dai, 2017). Concerning HIT advantages, Fernandez-Planelles et al. and Haried et al. conveyed that HIT implementation has necessitated, and enhanced, the interaction among patients, physicians and other care professionals without the barriers of time and distance.

Jassas (2015) studied the advantages of e-health smart network system. The architecture for this system includes medical sensors which can help the patients by measuring their physical parameters by using wireless sensor networks (WSNs). These

sensors transfer data from patients' bodies over the wireless network to the cloud environment which is a form of HIT. Rahmani et al. (2018) also noted that because of the ubiquitous computing nature of IoT, all the health care system entities (individuals, appliances, medicine) can be monitored and managed continuously. By applying IoT technologies to health care, the quality and cost of medical care can be improved by automating tasks previously performed by humans Therefore, patients will have a high-quality service as the e-heath smart system supports medical staff by providing real-time data gathering of their medical data. The WSNs eliminates manual data collection, and enables the monitoring of huge numbers of patients, and removing the possibility of human error (Jassas, 2015).

Sheikh (2015) determined that perceptions of HIT included improved patient care, improved population health, and a reduction of health care expenditures for the patients and for the institutions running hospitals. Sheikh believed that HIT catalyzed the creation of a publicly accessible digital infrastructure and that users determined innovative ways to improve quality of care and realize cost efficiencies. Early experiences indicated that the resulting digital infrastructure in the field of health care enhanced the quality of care and curtail costs (Sheikh, 2015). Reform efforts in health care systems are severely limited by problems with usability across ages, limited interoperability, and the persistence of the fee-for-service paradigm. The ratio of aging population has risen significantly since 2012 meanwhile the progressive decline in physical and cognitive skills prevents elderly people from living independently and from performing basic

instrumental activities of daily living (Mshali, Lemlouma, & Magoni, 2018). Addressing

these issues needs to be the federal government's main policy target to ensure a wider

coverage in terms of patients who can actually access HIT features (Sheikh, 2015).

In today's modern technological world, the best and most efficient ways to

improve the quality and effectiveness of health care services is through HIT

implementation. Sun and Qu (2015) concluded that understanding the factors that have

significant effects on HIT adoption may assist practitioners and policy makers in

developing effective solutions to the HIT implementation process, making it smoother

and seamless for physicians, patients, and other health care professionals. Primary care

leaders can improve the quality of patient care by providing accurate, timely, reliable, and

secure data to users. Primary care physicians who implement HIT can help improve the

quality of patient care significantly. The quality of patient care in hospitals can improve

significantly after HIT implementation (Khatri & Gupta, 2016). However, to ensure

quality health care as a result of HIT implementation, training and coaching should also

be a priority to equip the patients and the health professionals with the knowledge and

educated on how to make the HIT system work.

HIT implementation in the primary health care industry has the potential to

improve patient safety and health but its implementation and use has led to unintended

consequences and new safety concerns (Singh, 2015). A key challenge when improving

safety in health IT-enabled health care systems in hospitals and clinics is to develop

valid, feasible strategies to measure safety concerns at the intersection of health IT and

patient safety. Graber, Siegal, Riah, Johnston, and Kenyon (2019) also noted how the adverse events associated with HIT vulnerabilities can cause extensive harm and are encountered across the continuum of health care settings and sociotechnical factors. The HIT framework should be able to facilitate organizational learning and involvement of the HIT vendors in the health needs of the patients who use their HIT applications (Singh, 2015). HIT vendors should consider that not all users of HIT are already adept with the know-how on how to properly use technological gadgets required to effectively use the HIT system.

Medical error and improper treatment, as a result of wrong patient information, tends to be a major concern in the health care industry, which can worsen a patient's condition, potentially resulting in premature death. Risks to patient safety occur throughout health care settings by failure to correctly identify patients, resulting in the incorrect patient, incorrect site procedure, incorrect medication, and other errors (Jeon et al., 2019). The implementation of HIT and barcode technology can prevent medical errors by providing detailed and reliable information for patient care. Barcode is one of the most powerful and economical methods of improving the patient safety and reducing cost (Hachesu, Zyaei, Leila, & Hassankhani, 2016). The readiness of the health professionals and the patients should always be considered when starting to implement HIT system. However, effective and successful implementation of barcode technology depends on the various issues including financial planning and organizational readiness. According to Hachesu et al. (2016), the most critical steps for the successful

implementation of barcoding in health care organizations largely depends upon the readiness of managers to accept and apply the policies of barcode technology, allocation of priorities, and monitoring applications.

The U.S. Department of Health and Human Services officials conducted a study to examine the relationship that exists between HIT and health outcomes, costs, and administrative efficiencies. The findings made by different studies demonstrated a positive relationship between HIT use and health outcomes (U.S. Department of Health and Human Services, 2016). Feinberg et al. (2016) determined that 50% of the health care funds get wasted because of inefficient processes, yet implementation of HIT have measurable financial benefits. Henry et al. (2016) noted that 75% of laboratory technicians reported that use of electronic medical health records helped them to get lab results faster using a conventional method. The research works of Feinberg et al. and Henry et al. are significant in highlighting the profit potential and cost savings as a result of HIT implementation.

According to Gesulga et al. (2017), HIT implementation enables error-free and high-quality care in effective and efficient ways. In addition, HIT helps in making the access to crucial information needed by professionals in remote areas easy (Garofalo et al., 2015). HIT implementation is also essential to ensuring clear and complete documentation of patient's health records. The implementation of HIT in primary care facilities makes the challenge of deciphering someone else's handwriting outdated. Primary care practitioners enter their orders directly into computer systems, potentially

eliminating transcription errors and dramatically improving turnaround time. For
example, when a practitioner enters a prescription order, the system automatically checks
for any adverse drug interactions or allergies and immediately alerts the physician if any
are found. Another benefit of successful HIT implementation in the primary care industry
included the easier and faster tracking of drug interactions warnings (Institute for Safe
Medication Practices, 2017). Garofalo et al. (2015) and Gesulga et al. (2017) collectively
confirmed the potential improvement and value HIT implementation can add to health
care services.

Implementation Failure of Health Information Technology

Over a short time, some PCPs have realized they can daily depend upon HIT for
operational benefits. Interest in HIT adoption continues to grow significantly among
practitioners and other care providers due to its possible positive impact on health care
(Gesulga et al., 2017). The implications and importance of HIT result in rapid growth,
thereby, creating fierce competition in the primary care industry (Garofalo et al., 2015).
Although HIT implementation contributes significantly to the performance and growth of
other health care organizations, HIT implementation alone does not guarantee an
improved organization's performance, profitability, or a competitive advantage in the
health care industry (Yusif, Hafeez-Baig, & Soar, 2017).

Fischer (2014) conducted a seminal study regarding the barriers inherent in HIT
uptake by patients. For example, elders face many barriers in using technology for health
care decision-making, including (a) issues with familiarity with the use of technology, (b)

willingness to ask for help, (c) trust of the technology, (d) reduced privacy, and (e) intuitive user design continue to challenge implementation success (Fischer, 2014). The barriers identified by Fischer must be addressed for HIT tools to be available to the growing population of patients who belong to different generations. Design, education, research, and policy all play roles in addressing these barriers to acceptance and use (Fragidis & Chatzoglou, 2018). Fischer noted that elderly people approach the Internet and HIT differently than their younger counterparts but have growing rates of adoption. Assistive technology in the field of health care, such as sensors or home monitors, may help aging in place but not yet evaluated because of lack of sufficient support to the usage of HIT (Fischer, 2014). As a form of assistive technology, it must be noted that HIT should not substitute for the real health care attention from doctors and health care professionals when ultimately necessary. Therefore, successful implementations of HIT should also include patient promotion and provide a user-friendly information system that assists user adoption (Soh, 2017).

HIT implementation failure negatively affects primary care facilities. Yusif et al. (2017) found that a lack of readiness assessment factors, including core readiness, engagement and buy-ins readiness, technological readiness, and IT skills readiness were the major cause of failures. HIT implementation readiness refers to the preparedness of PCPs and their technical team for the anticipated change brought by programs related to HIT. Therefore, conducting readiness assessments prior to HIT implementation can help reduce HIT implementation project failure while increasing the success rate. However, it

is essential to understand the determinants of readiness for HIT adoption. After

determining readiness, the effectiveness of the implementation process is as important as

the quality of the system implemented (Fragidis & Chatzoglou, 2018). Therefore, before

implementing HIT applications or before using HIT applications, health professionals

should be equipped with sufficient knowledge and skills on how to better implement HIT.

Fragidis and Chatzoglou, and Yusif et al.'s studies remain useful in identifying HIT pre-

implementation and post-implementation preparedness for sustainable HIT adoption.

     Prior to a HIT implementation, organizational leaders should evaluate the fit

between employee computer skills and the proposed electronic health record system

(Fragidis & Chatzoglou, 2018). Having employees who lack computer skills, and who

dislike or are disinterested in adopting computer usage, will negatively affect HIT

implementation (Yusif et al., 2017). Furthermore, the quality of the design of the system

graphical user interface, the functionality of the features incorporated project

management, procurement, and user previous experience also affect the implementation

of HIT (Birken, 2019). However, lack of efficient implementation team, insufficient

support by management, and inadequate startup planning can lead to HIT implementation

failure (Birken, 2019).

     In a study conducted by Mettler (2016), to explore varying HIT implementation

consequences and expectations, the author investigated factors affecting the viability and

fit of HIT. Mettler found that different stakeholders perceive HIT viability and fit of the

same HIT services while analysis demonstrates that there can be a discrepancy between

the organizational viability and individual fit of a HIT. Mettler noted that managing expectations throughout the HIT implementation process is a key determinant in avoiding HIT implementation failure. Ratwani, Reider, and Singh (2019) discovered many existing HIT products built on technical frameworks that limit the scope and frequency of design improvements necessary to improve usability. However, successful HIT implementation is not possible without genuine engagement from all stakeholders, particularly vendors who should consider greater transparency of their products (Ratwani et al., 2019).

In spite of the positive effects of HIT in primary care practice, HIT implementation barriers tend to create negative impressions for prospective practitioners. One obstacle that affects the implementation of HIT is poor infrastructure, where there are insufficient resources needed for implementing HIT and meeting the demands of the increasing population (Ivarsson, Wiinberg, & Svensson, 2016). The lack of required infrastructure, or equipment such as computer software, hardware, wireless communication channels, and skilled professionals, have made some HIT implementations difficult. Some of the resources needed such as hardware and software are costly and besides, lack of qualified personnel to supervise adequately the implementation process (Fragidis &Chatzoglou, 2018). The authors confirmed through their research how necessary available resources and personnel are to the success of HIT implementation. Therefore, though practitioners HIT adoption has the potential to improve health care services, lack of necessary resources and staff can harm HIT implementation.

According to Couchoro (2016), the major problems for the implementation of HIT are time and financial constraints. The complex nature of transformation and implementation of HIT makes it challenging to complete in a short period (Klersy et al., 2016; Martin et al., 2016). One of the major barriers in the implementation of HIT is that patients would most often prefer to be able to talk to their doctors than actually use gadgets and machines to deal with their health concerns and issues. Other barriers, such as cost and a lack of skilled personnel, prolong the process of HIT implementation and increase failure rate. Government health and technology policies that are not in support of HIT make transformation and implementation difficult. Government and administrators of a country are critical partners in ensuring successful implementation of health projects. Government support for HIT research is needed both financially and legally to successfully implement working plans (Kaufman, Kannampallil, & Patel, 2015). The health needs of the patients, relating to the transformation of a system, could improve through an effective, secure, and efficient national policy (Whitt et al., 2017). These studies are useful in indicating the possible challenges, barriers, and problems in HIT implementation to help plan effectively to avoid such occurrences.

In addition, there are also cultural and social barriers that affect the successful HIT implementation in the health care industry. E-readiness and the digital divide are the major cultural and social barriers in the implementation of HIT which include less motivation, anxiety to use and adopt a new technology (Barrett et al., 2016; Lippman et al., 2016). Thus, private practice practitioners should be aware that social and cultural

barriers also affect HIT implementation (Barrett et al., 2016). Further, Lippman et al (2016) determined that culture and social norm differences can foster the wrong impression making it difficult for health technology officers to convince leaders to adopt and implement a HIT (Yen, McAlearney, Sieck, Hefner, & Huerta, 2017).

The Future of Health Information Technology

Leaders view implementation of HIT as just another technology project which is very promising in the technological advancements in health care. Since 2009, various investments have been made in health care sectors around the world to implement health information to improve health care delivery (Bruns et al., 2018; Itrat et al., 2016). The product types included under the umbrella of HIT are diverse and include telemonitoring tools, mobile health technology, electronic health records, sensor technologies, and other medical devices (Bruns et al, 2018). According to Cresswell and Sheik (2016), the use of HIT products gradually affects almost every health care setting worldwide. Health care workers are reporting instances of psychological stress induced by health care information technology (IT) because of lack of sufficient skills in dealing with technology and related gadgets (Califf, 2015). Several researchers have established a valuable research program by which to study psychological technostress in health care workers (Cresswell & Sheik, 2016). Meanwhile, none confirms that IT bears, noting that technostress associates with negative perceptions and harmful effects of technology in its efficient implementation in the health care industry (Califf, 2015).

With the development of e-commerce, a growing number of people and patients prefer to purchase medicine online for the sake of convenience and to avoid having to physically buy the medicine from the pharmacy (Zhang, 2015). However, it is a serious issue to purchase medicine blindly without necessary guidance and this forms part of the barriers that have to be addressed to have an effective HIT (Zhang, 2015). Health care practitioners HIT implementation and use has become a necessary strategy because of the immense benefit derived from HIT implementation. The expected benefits, future challenges, and the rapid growth of HIT, will directly affect the decisions of policymakers (Colicchio et al., 2016). According to researchers, HIT implementation in the primary care industry is likely to reduce medical errors, incorrect prescriptions, and improve performance (Bardach et al., 2017; Chase et al., 2017; Francis et al., 2017). Furthermore, the implementation of HIT by PCPs sets the pace for better- and high-quality services in health care and increases profit through waste reduction (Neufeld, Doarn, & Aly, 2016). The proper implementation of HIT can make high quality services in health care more accessible for patients. Patients are also more equipped with choices on how to properly manage their own health. These studies are useful in identifying the benefits of HIT implementation to practitioners, patients and other stakeholders in the health care industry.

Health Information Technology and the Cloud

HIT adoption continues to grow at a fast pace with consistent changes aimed at improving health care, waste reduction, and profit maximization (Narayanan &

Cherukuri, 2018). The health care industry is under constant pressure to streamline the sharing and availability of information while maintaining rigorous controls over patient privacy and at the same time, reducing costs (Narayanan & Cherukuri, 2018). HIT plays a significant role when considering health care delivery by supporting the care of patients for better health care with advantages regarding cost-effectiveness. Cloud computing technology is an important milestone and development in medical informatics (Hsieh, 2015). Therefore, within the primary care industry, cloud-assisted HIT implementation tends to scale data up and down in real-time, which leads to an efficient way of using data resources (Narayanan & Cherukuri, 2018).

The use of cloud computing technology allows both the patients and health professionals to have real-time access to the health records without having to meet in person (Sumathi & Poongodi, 2016). Despite its potential, there are gaps and barriers to understanding how users evaluate change in relation to the health cloud and how they decide to resist it (Hsieh, 2015). The resistance by the health professionals in hospitals and clinics to the use of the health cloud is the result of regret avoidance, inertia, perceived value, switching costs, and perceived threat(s) (Hsieh, 2015). However, attitude, subjective norm of the patients and health professionals, and perceived behavior control have positive and direct effects on health care professionals' intention to use the health cloud (Hsieh, 2015).

The World Health Organization (2015) (as cited in Narayanan & Cherukuri, 2018) estimated that thirty-six million (out of fifty-seven million) global deaths were

because of non-transmissible diseases such as stroke, heart disease, cancer, chronic respiratory diseases, and diabetes. The cloud will aid medical professionals' accessibility to patients' medical records by enabling them to decide on a treatment plan to save patients in emergencies (Hanen, 2016). It is challenging for care providers to decide upon on the treatment plan, if accurate, legible, and updated medical records for patients are not readily available, (Narayanan & Cherukuri, 2018). As cited in Narayanan and Cherukuri (2018), the results of the World Health Organization report noted that patients are able to better plan for their treatment schedules because of the presence of HIT facilities and applications. In relation to the study, what is needed is not just a new set of integration technology approaches, but also a fundamental change in the way health care information systems and processes to handle integration requirements.

A new technology for mobile web services, mobile cloud computing, can be used in the field of health care (Hanen, 2016). Accordingly, Hanen (2016) assumed that mobile cloud computing is likely to be of the heart of health care transformation because the patients are now better empowered. In fact, mobile cloud computing offers new kinds of services and facilities for patients and caregivers. In this regard, a new mobile medical web service system can help patients and health professionals with fast dissemination of information and service provision (Hanen, 2016). Many health care managers continue to move services into the cloud environment (Hsieh, 2015). It is better to store data in this own format, when compared to Big data (Narayanan et al., 2018).

The proper collection, management, and utilization of health information plays a critical role in detecting medically-based innovative solutions and allocating resources to treat patients (Yang et al., 2015). Noted by Hanen (2016), information technologies are widely employed to improve the quality of health care services. In a study by Yang et al. (2015), the researchers examined emerging state-of-the-art information technologies for enhanced health care and provided insight on how the developments in IT can influence health care practices. Emerging health information technologies such as electronic health records adoption have the potential to enhance health care abilities, boost preventive care, and foster collaborative health care (Yang et al., 2015).Thus, Hanen and Yang et al. determined that preventive health care can be better managed if patients have access to HIT technology because of their ability to know more information about their personal health.

Trends in health care, big data analysis, and cloud computing in health care, all show exciting new developments (Hanen, 2016; Yang et al., 2015). The safe interoperability of HIT, and other features of IT in health care, minimally require system components that aligned about a conceptual model (Robkin, 2015). HIT devices can be assured to be safely interoperable cross-manufacturer only if different manufacturers share the conceptual model embodied by the communicating devices (Robkin, 2015). Insights from Hanen (2016), Robkin (2015), and Yang et al. (2015) underscore the important of PCPs to understand the strategies to successfully implement HIT.

Health Information Technology and Fraud

Health care leaders who adopt the latest electronic health record technology may realize benefits in the efficiency and quality of health care. The introduction of specific HIT, such as the electronic health records, helps to reduce delay, fraud, and unnecessary errors made by health care professionals. Health care fraud is a serious problem affecting every patient and consumer (McGee, Sandridge, Treadway, Vance, & Coustasse, 2018). The potential failure of the HIT system is not only in the excessive financial losses incurred, which extend into the billions of dollars every year but also inpatient harm. Islam (2015) investigated the impact of modern health technology and the Internet in health care by interviewing key health care professionals, elected representatives, and local informants. McGee et al. and Islam's study findings indicated that modern health technology, the Internet, and electronic devices for recording health data, enhanced health care delivery. The authors' findings are significant as it showed that health information and communication technology is an effective mechanism for reducing corruption and promoting transparency.

The introduction of HIT in primary care facilities can lead to unintended consequences which must be strictly monitored to ensure that there will be no detrimental impact for the patients (Melby, 2014). Communicating via e-messaging, utilized in the health care system, can lead to less face-to-face contact between homecare nurses and general practitioners. Even though e-messaging means that there is an opportunity to communicate more efficiently, both groups emphasized the need for sustaining

interpersonal relations via face-to-face communication to collaborate efficiently (Melby, 2014). For example, nurses who use HIT in dealing and interacting with their patients experienced e-messages as a more powerful means of communication to their patients vis-à-vis general practitioners than other means of communication, thus making e-messaging a tool for empowering them in their collaboration with general practitioners (Melby, 2014). Nurses said that the fact that e-messages were automatically documented in the patient's electronic patient record system gave more weight to their requests. On the centrally, Oppezzo et al. (2018) stated that e-message intervention did not improve treatment adherence, future studies can learn from this pilot and may incorporate more variety in the prompts and more interaction to promote more effective user engagement.

Unintended consequences of HIT affect collaboration between health care workers and therefore, the unintended consequences of HIT should be properly observed in order to prevent them from happening (Melby, 2014). The consequences may be both desirable and undesirable, with previous research primarily focusing on the undesirable unintended consequences. Melby (2014) noted that this can affect both the patients and the health care providers. The introduction of e-messaging has led to both desirable and undesirable unintended consequences for interprofessional collaboration because of the less interaction between the patients and the health professionals (Melby, 2014). Consequently, post HIT implementation tasks and responsibilities were sometimes reconfigured in unexpected ways (Melby, 2014). Islam (2015) advocated that managers who control task reconfiguration will more reliably achieve successful HIT

implementation. Islam and Melby's studies are essential because more insight into

positive unintended consequences accrued to the implementation of HIT could be a

resource for planning work reorganization. Further, reconfigured tasks and

responsibilities must be accomplished to ensure that the desired benefits of employing

HIT in the health care system achieved.

Fraudsters commit a wide variety of schemes against private and public insurance

companies by filing fictitious health care claims to generate profits (McGee et al., 2018).

For example, Boris Sachakov, the indicted owner and operator of Colon and Rectal Care

of New York, used HIT to aid fraud (Association of Certified Fraud Examiners, 2018).

Sachakov's indictment papers noted submission of more than $22.6 million in false and

fraudulent claims to Medicare and private insurance companies for surgeries and medical

services that were never provided, Sachakov received more than $9 million on those

claims (Association of Certified Fraud Examiners, 2018). Sachakov illegally collected

those funds because of open technology accessibility, downplaying the record trace by

HIT (Association of Certified Fraud Examiners, 2018). Subsequently, to combat all

categories of insurance fraud, the Obama administration created the Health care Fraud

Prevention Partnership to detect waste, fraud, and abuse (McGee et al., 2018). McGee et

al. (2018) determined that over the seven years of the Obama administration, the U.S.

government worked more efficiently to combat Medicare waste, fraud, and abuse through

HIT use, education, and research. Therefore, as further innovation is still expected in the

field of HIT in order to create a more accessible health care system and to minimize the

barriers to the successful implementation of HIT, more study is justified.

The e-HIT scores of most nurses and health professionals indicated that the

communities had underestimated the amount of work involved in implementing at scale

for the HIT technology in the health care system (Devlin, 2015). The new knowledge

being generated through the different HIT programs may contribute to the ongoing

transformation of digitally enabled health care system (Yeow, 2015). Thus, Devlin (2015)

expects more personalized flexible models of provision, which resonates with the current

e-health policy environment. The effects of telemedicine, as a feature of HIT on the input

allocative efficiency of the health care process through the reallocation of organizational

resources, was evaluated. Yeow (2015) assessed whether gains in allocative efficiency

resulted in improvements in organizational outcomes in organizations that use HIT, such

as lower hospitalization rates and lower uncertainty in patient wait time. Applying the

theory of swift and even flow, Delvin and Yeow suggested that the gains in allocative

efficiency for some processes are associated with improved organizational outcomes and

therefore, the use of HIT and telemedicine should be supported.

Summary

Kelly (2016) determined that the adoption of HIT in hospitals and health care

increased operating costs but also provided certain benefits to the health care.

Furthermore, health professionals and patients are empowered to use HIT to monitor their

health (Dranove, 2014). HIT is a technology project, which is very promising in terms of

the technological advancements in health care. Evidence-based medicine is devoted to developing the science and technology of clinical epidemiology and improving the technical means of applying its principles and tools consistently and efficiently to help and benefit the patients (Kelly, 2016). The research question in this study was, "What successful strategies do PCPs use to implement HIT to improve primary facility care delivery and profitability?" The relevant studies about HIT, and how it is implemented by health care professionals, were discussed in the literature review of this study. This chapter also included a discussion on the challenges and barriers. To better understand the concepts in literature, the theoretical frameworks were applied. To have a well-founded data analysis, the review of literature serves as a basis for the next section.

Transition

Section 1 entailed the background of the study and included the problem and purpose statements. I further articulated the central research question and interview questions before an in-depth description of the nature of the study. This chapter also included a discussion on HIT implementation prospects, challenges, and barriers. The theoretical frameworks were applied to understand the concepts in literature better. The review of literature will serve as a guide in the next chapters to have a well-founded data analysis of the data in this study. Section 2 addresses the purpose statement, role of the researcher, participants, research method and design, population and sampling, ethical research, data collection instrument, technique, and analysis, reliability, and validity of the study, and provides an overview of Section 3.

Section 2: The Project

The purpose of this study was to explore successful strategies PCPs used to implement HIT to improve primary facility care delivery and profitability. The specific business problem is some PCPs lack successful strategies to implement HIT to improve health care delivery and facility profitability. The research question for this study was "What strategies do PCPs use to successfully implement HIT to improve health care delivery and profitability?" To answer this question, I interviewed PCPs who successfully implemented HIT to improve health care delivery as the source of data (e.g., participants). Additionally, qualitative methodology with a multiple case study design was used to address the research question.

Section 2 includes the different aspects of the chosen methodology. The discussion is aligned with a qualitative multiple case study. Therefore, the 10 topics are (a) restatement of purpose statement; (b) role of the researcher; (c) participants; (d) research method and design; (e) population and sampling; (f) ethical research; (g) data collection instruments; (h) data collection technique; (i) data analysis; and (j) reliability and validity.

Purpose Statement

The purpose of this qualitative multiple case study was to explore successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability. The target population comprised PCPs from six primary care facilities successfully using HIT for daily health care delivery in Queens County, New York. For

the HIT implementation to be considered successful, the PCPs must have (a) confirmed a

postimplementation revenue increase of 8% within two calendar years, and (b) improved

year-over-year patient satisfaction measures. The implication for positive social change is

that successfully implementing HIT could improve primary health care delivery and

facility profitability. Improved primary facility health delivery can include streamlined

patient processes, improved diagnoses efficacy, faster and more consistent assessment

protocols, consistent record keeping, improved patient registration, facilitated patient

record transfer, and immediate access to patient medical records during treatment

continuation. Improved facility revenue includes an increase of 8% or more within 2

years of a successful HIT implementation. Finally, the findings could enable PCPs to

improve patient care by addressing HIT implementation deficiencies.

Role of the Researcher

A researcher has one of the most important roles in a study (Fusch & Ness, 2015;

Hatch, 1996; Nelson, London, & Strobel, 2015). My role in this study was to examine

and analyze the data collected regarding successful HIT implementation in the primary

care setting. The research tasks included (a) recruiting eligible participants, (b) collecting

and transcribing data, and (c) performing data analysis.

As a recruiter, I contacted potential participants and invited them into the study.

During the recruitment phase, family members, relatives, friends, and colleagues,

especially coworkers who are in subordinate roles were excluded to avoid conflict of

interest. All participants read and signed an informed consent form to ensure that they are aware of their rights and roles in the study.

Because qualitative case study designs necessitate multiple data sources (Yin, 2017), this study included several sources. Further, methodological triangulation includes gathering information from more than one source to answer the research question and improve the validity of the research findings (Fusch & Ness, 2015). I used methodological triangulation to compare findings from various sorts of information sources such as interview responses and relevant practice documents. The data collection process involved audio recorded face-to-face interview with study participants that I transcribed. I also used member checking to enhance quality and confirm the accuracy, validity, and credibility of the study.

To refrain from asking irrelevant or leading questions during interviews, I used a detailed protocol guide (see Appendix A). Additionally, because the quality of research data depends on the researcher's ability to reduce bias and properly interpret data (Marshall & Rossman, 2016), I reduced bias by using an identical protocol for all interviews while taking notes and audio recording the interviews. The interview protocol was developed considering the standards of the College of Management and Technology at Walden University.

After completing data collection, I scrutinized the study data and perform thematic analysis. During the data analysis, the steps from Braun, Clarke, and Terry (2014) was employed to refrain from making hasty interpretations or unsupported

conclusions from the data. Braun et al.'s analysis steps included (a) familiarization, (b)

coding, (c) initial theme development, (d) theme revision, (e) theme finalization, and (f)

report generation.

Another important role that the researcher must perform is ensuring that the

Belmont Report (1979) protocol is followed. According to the Belmont Report,

researchers must address three elements when using human participants to a study: (a)

respect for persons, (b) beneficence, and (c) justice. First, ensuring that the participants

are respected involves showing transparency in how the research will be conducted

(Belmont Report, 1979). Therefore, I ensured respect for participants through the

informed consent process. Participants knew what their involvement would be in the

study before deciding to participate through the informed consent. I also eliminated the

perception of any coercion and focused on encouraging eligible parties to participate.

Further, the identity of participants remained confidential through pseudonyms.

Second, beneficence involves protecting participants from any harm during the

research (Belmont Report, 1979). I conducted my study adhering to standards that protect

participants. Moreover, the topic of the study and the data collection measures did not

involve any possible retraumatization of participants, as no one should be harmed or

compromised during the process (Belmont Report, 1979). Finally, the study only

included the collection of data that meets the requirements of the methodology.

Justice refers to the identification and acknowledgement of the motivation of the

selection of subjects (Belmont Report, 1979). To ensure justice, the researcher must

adhere to procedures reasonable and nonexploitative. I only recruited eligible participants who volunteered after being invited and then reviewed and signed the informed consent prior to the interview. All actions of the study and the participation scope was explained to each eligible participant before these individuals signed off on their informed consent to be part of the study. Finally, the raw data have been stored in a designated file on a password-protected computer and printed items and documents stored in a locked and secured home office file cabinet until it can be shredded 5 years after the study approval by Walden University administrators.

Participants

The participants for this study included PCPs who have successfully implemented HIT to improve primary facility care delivery and profitability. I recruited participants through purposive sampling, which is a method of recruiting and selecting participants with the right knowledge, experience, and characteristics that are needed to address the research question (Barratt, Ferris, & Lenton, 2015; Etikan, Musa, & Alkassim, 2016). Most researchers of case studies use purposive sampling because of its appropriateness in collecting relevant and effective participants for the study (Barratt et al., 2015). Subjects are selected considering study purposes with the expectation that each participant will provide unique and rich information of the value to the study (Etikan et al., 2016). Therefore, a purposive sampling was appropriate for this study.

When conducting purposive sampling, the researcher must have a set of eligibility criteria that are aligned with the requirement for selecting the participants (Barratt et al.,

2015; Etikan et al., 2016). The participants for this study fulfilled the following eligibility criteria: (a) PCPs; (b) successfully implemented HIT that realized a postimplementation revenue increase of 8% within two calendar years; (c) observed a post-HIT implementation improvement in year-over-year patient satisfaction measures related to health care delivery; and (d) work in a health care practice situated in Queens County, New York. Having passed the eligibility screening requirements as a part of purposeful sampling (see Appendix B), participants were deemed to be knowledgeable and experienced in HIT implementation. Additionally, to focus the geographic area of the study and enable face-to-face interviews, the participants were delimited to Queens County, New York. I determined whether the participants satisfied the eligibility criteria by asking a series of demographic and screening questions during the recruitment phase of the study, as noted in Appendix B.

Successful planning for gaining access to study eligible participants requires that researchers interact with individuals who have knowledge aligned with the topic of their study (Hoyland, Hollund, & Olsen, 2015). Successful planning ensured that I had enough time to conduct prompt interviews and collect data specific to the study. After the approval from Walden University Institutional review Board (IRB; 08-23-19-0621469), I began with facility visitation and participant invitation, participant screening for eligibility (see Appendix B), informed consent, and data collection scheduling.

I searched the Internet for the phrase *primary care practice in Queens, New York, NY*, which yielded 529 results. This list of primary care practices was narrowed by

considering specialties and proximity to my office. I gained access to participants by visiting facilities in person to invite potential participants. The facilities were in Queens, New York where PCPs work. Moreover, through the invitation process, I established a working relationship with potential participants by describing the study purpose and providing my work experience and educational background.

Research Method and Design

Research Method

I conducted a qualitative study with a multiple case study design to fulfill the purpose of this study. The purpose of this qualitative, multiple case study was to explore successful strategies PCPs use to implement HIT to improve primary facility care delivery and profitability. A qualitative methodology is appropriate for studies that involve in-depth exploration of a phenomenon within its natural environment (Lewis, 2015; Marshall & Rossman, 2016; Silverman, 2015). Qualitative researchers usually focus on individuals, events, and contexts with an emphasis on idiographic style of analysis (Gerring, 2017). For this study, the goal was to explore the perceptions of PCPs who successfully utilized HIT to improve health care delivery and facility profitability. Therefore, a qualitative methodology aligned with the requirements for fulfilling the purpose of this study.

In contrast, a quantitative research methodology is appropriate for studies that require collection and analysis of numerical data represented in statistical form (Goertzen, 2017; Marshall & Rossman, 2016). Quantitative methodology involves

establishing relationship between variables (Goertzen, 2017). Using quantitative methodology was not appropriate for this study because I did not need to establish relationships between variables to answer the central research question. Moreover, to address the research questions, I dedicated an exploration into participants perceptions versus statistically analyzing a data set.

Further, mixed methodology is useful when there is a need to collect and analyze both qualitative and quantitative data based on selected predetermined research questions (Marshall & Rossman, 2016; Paull & Girardi, 2017). Based on the research question of the study, I required in-depth qualitative data about the participants' perceptions. However, there was no need to collect numerical data and perform quantitative statistical analysis to address the research question completely. Therefore, qualitative methodology was the most appropriate option for this research.

Research Design

A multiple case study design was applied for this study. Multiple case studies are appropriate when exploring perceptions of individuals to understand a phenomenon (Yin, 2017). A multiple case study is useful when exploring a specific phenomenon based on the perceptions of a homogeneous group of individuals (Yin, 2017). To present a comprehensive and contextual picture of a study's subject, multiple case studies are employed (Marshall & Rossman, 2016; Yin, 2017). Based on the need to address the purpose and answer the research question by collecting rich data, a multiple case study design was appropriate.

I chose a multiple case study research design over other design options for this study to gather information PCPs in Queens, New York. Phenomenology is a research design involving in-depth exploration and understanding of lived experiences of individuals to make sense of a phenomenon (Moustakas, 1994). However, phenomenology did not fit the requirements of this study because there was no need to explore lived experiences to address the research question. Another design option, ethnography, is appropriate when exploring a phenomenon with a focus on people and cultures (Ingham-Broomfield, 2015). However, the purpose of this study did not require exploring PCPs' cultural and social backgrounds. Narrative inquiry is another design, which is commonly used when there is a need to collect and analyze data in chronological manner to address the research question of the study (Anderson, Leahy, DelValle, Sherman, & Tansey, 2014). The narrative design was inappropriate for this study because there was no need to explore the phenomenon using data presented in a storied or chronological manner. Therefore, a multiple case study was the most appropriate design for this study, based on the purpose and research question.

Population and Sampling

The scope of this multiple case study included a purposeful sample of six practitioners from six primary care practices in Queens, New York who had successfully implemented HIT to improve health care delivery. Purposeful sampling involves identifying suitable participants who have in-depth knowledge of practices relevant to the study (Yin, 2017). Having access to the knowledge of participants can ensure better

collection of data and enable a researcher the opportunity to understand better what they are researching (Gustafson & Hertting, 2016). Eligible participants were chosen because their experience and knowledge of HIT implementation aligned with the study. The appropriateness of the study population was dependent on the purpose and research question, which dictated PCPs.

The sample size should be based upon expected saturation point (Fusch & Ness, 2015; Tran, Porcher, Falissard, & Ravaud, 2016). The point of data saturation is the basis for finding the sample size is sufficient (Tran et al., 2016). A researcher reaches data saturation point when the following criteria are evident in the data: (a) no new information obtained; (b) no new codes required, and (c) no new themes emerged with the addition of a new data set. Yin (2017) claimed that at least six participants will be enough to obtain data saturation for multiple case studies. Selection of six participants for the study facilitated the collection of a variety of perspectives, encouraged substantive comparison during data analysis, and resulted in the achievement of data saturation.

I personally visited facilities of participants and invited them to participate in my research based upon the eligibility criteria explained previously. I followed up to planned meetings with participants at the time and place of their choice. The participants read and signed informed consent form to gain information about the scope of participation and the study. Face-to-face interviews were then conducted with participants in their offices on-site free of noise and distraction which enhanced the quality of audio recordings. To ensure that participants understood and answered the central research question, I shared

the interview questions in advance with the participants when I visited to invite them to participate in the study.

Ethical Research

Researchers who use human participants in their studies must address ethical issues related to the subject recruitment, data collection, and analysis of data (Denzin & Giardina, 2016; LaRossa & Bennett, 2018). To ensure ethical issues are addressed, the researcher should provide an informed consent to every participant before beginning data collection (Blease, Lilienfeld, & Kelley, 2016; Grady, 2015). For this study, all participants received and signed an informed consent form before the face-to-face interview. I included the purpose and possible benefits of the study, overview of data collection process, length of participation, and description of the minimal risks to participants in the informed consent. I did not initiate any data any data collection process before IRB approval and assigned number (08-23-19-0621469).

Furthermore, to ensure ethical standards in research, data must be kept confidential and secure. Pseudonyms instead of the real names of the practitioners were used to ensure participants confidentiality. All materials used for the research were stored in a designated file on a password secured computer. Hard copy documents were also secured in a locked cabinet at my office. I have stored all data in these secured locations for 5 years after receiving Walden University administrative approval for the completed research study. After 5 years, I will delete and shred all electronic information stored and related documents respectively.

All participants were volunteers. I did not force anyone to be part of the study.

The study did not include any incentives or compensation to participants. Participants had

the right to decline participation and withdraw from the study at any time without any

consequences.

Data Collection

The data collection process first included obtaining IRB approval to conduct my

study, determining the appropriate sampling strategy, data recording, and data storage

plans, and making sure all study aspects would comply with IRB ethics standards. The

data collection sources for this study included face-to-face interviews and review of

relevant practice documents.

Instruments

Face-to-face interviews are effective in collecting in-depth data because of the

follow-up questions that interviewers may ask (Kallio, Pietila, Johnson, & Kangasniemi,

2016; Katz, 2015). I used an interview protocol, as noted in Appendix A, to aid in

conducting the interviews. The purpose of this qualitative, multiple case study was to

explore successful strategies PCPs use to implement HIT to improve health care delivery

and facility profitability. The target population comprised PCPs from six primary care

facilities successfully using HIT for daily health care delivery in Queens County, New

York. As planned, for each participant I completed the participant eligibility confirmation

(Appendix B).

The main research question was, what successful strategies do PCPs use to implement HIT to improve primary facility care delivery and profitability? To answer the main research question, to address the research purpose, and to gain information about the perceptions of participants, I asked the same prepared 10 interview questions, in the same sequence, of each participant.

Data Collection Technique

The data collection for this study underwent two phases: (a) face-to-face interviews and (b) review of relevant practice documents. An interview is a useful source for case study research due to participants' flexibility in sharing their experiences (Yin, 2017). The interviews were conducted with pre-screened and eligible practitioners, see Appendix B. An interview is a useful source for case study research because of participants flexibility in sharing their experiences (Yin, 2017). During the recruitment phase, I prescheduled each interview based on the preferred time of the participants. All interviews were conducted inside the facility where the participant works. I audio-recorded all interviews, subject to the permission of participants, as highlighted in the informed consent.

To maintain interview consistency, I followed an interview protocol, as noted in Appendix A with the same 10 interview questions. To begin the interview, a brief introduction was given about the data collection, the topic of the study, purpose of the interview, and flow of the session as part of the introduction. After the brief introduction, I began asking predetermined interview questions using the interview guide. Asking

follow-up questions occurred where necessary to explore deeper into the answers of the participants. All such follow-up questions were included in my interview observation notes. To clarify meaning and garner more relevant details. I asked follow-up questions to my 10, main interview questions. After exhausting all questions in the interview guide, participants were informed and then thanked them for their time.

For each interview, I transcribed the recorded interview and wrote a one-page summary and initial interpretation of the findings. The summary and interpretation were completed within a day after the interview. After finishing the transcript and initial interview guide, copies of these documents were sent to the respective participants. Therefore, each participant had the opportunity to member check the transcription and interpretation of the interview data for meaning accuracy, interpretation, and correctness. Member checking is one means to ensure data efficacy (Marshall & Rossman, 2016. Member checking for the study included offering participants opportunity to make any clarification, give other information concerning the study, or ask questions about the interview (Birt, Scott, Cavers, Campbell & Walter, 2016). All the participants reviewed the contents and provided feedback about the transcription where necessary. Through the process of member checking meaning accuracy and the viability of a researcher's interpretation is achieved (Varpio, Ajjawi, Monrouxe, O'Brien, & Rees, 2017).To complete the member checking step, participants were contacted through phone to discuss any inconsistencies in the transcripts and initial interpretations. After a thorough

discussion with participants, I updated the data. After performing member checking, I made soft copies of transcripts and uploaded the electronic files to the NVivo software.

Also, relevant documents of the participating primary care practice were reviewed as protocols, guideline and handbook. Therefore, data for triangulation for this multiple case study was a face-to-face interview and review of relevant practice documents including training manuals, registration process/documents, and continuous improvement plans.

Data Analysis

I conducted data analysis following Braun, Clarke, and Terry's (2014) thematic guidelines. The six main data analysis steps are (a) familiarization, (b) coding, (c) initial theme development, (d) theme revision, (e) theme finalization, and (f) report generation (Braun et al., 2014). I completed the first four steps and then assembled the data from the two sources (face-to-face interviews and review of relevant practice documents) before completing the fifth and sixth steps in thematic development.

For one data source, in the first phase of *familiarization*, I read the transcripts or NVivo file for each participant twice. My purpose in the first reading was to become familiar with the data set. Having established familiarity, the second round of reading included highlighting key descriptive words and phrases that were relevant to the central research question. In the second phase of data analysis, coding, I discovered and organized codes. Data from three participants supports development of codes for the descriptive texts highlighted in the first phase. I culminated straightforward, codes which

described how related or similar terms address the research questions. The codes were applied to all the data collected for the same data source. In the third phase, *initial theme development*, I grouped similar codes to form a theme and then labelling each theme. In the fourth phase, *theme revision*, I made changes to refine the initial themes identified in the third step.

After the fourth phase of theme revision, I reviewed data from the second source and confirmed the veracity of the data from the first data source. After performing the first four phases with the data sources, the fifth phase of *theme finalization* took place. I was able to compare and contrast themes and also identify major themes. Major themes were present in two or more data sources and single data source themes were considered minor. The sixth phase of *report generation* involved data summary, including an overview of participant demographics and a discussion of the data analysis findings from the analysis (see Section 3).

<div align="center">**Reliability and Validity**</div>

Reliability

Reliability of qualitative studies is evident through improving dependability (Lincoln & Guba, 1985). To ensure reliability through improved dependability, two practices were employed including (a) member checking and (b) an expert review of the data collection instruments. Described in detail previously, member checking is the process where participants can review the transcript and initial interpretation of data collected from them. The method of discussing the initial interpretation of each interview

with the participants, known as member checking, is useful in validating, verifying, or assessing the trustworthiness of qualitative results (Birt, Scott, Cavers, Campbell, & Walter, 2016). Through member checking, the participant's reviewed the contents of the initial interpretation and provided feedback about the accuracy and correctness of the information in the transcripts (Morse, 2015).

Face-to-face interviews, member checking, and review of relevant practice document served as the primary data collection tool. Following Lincoln and Guba's (1985) seminal advice for research reliability, I conferred with the Walden University faculty experts that form my doctoral committee for a detailed review of my proposal and advised in achieving valid, reliable, and meaningful study outcomes. Balkar (2015) demonstrated how an expert review ensured the reliability of an interview guide. For this study, the assigned doctoral committee faculty served as expert reviewers, responsible for reviewing the contents of the interview protocol (see Appendix A), informed consent, and the participant eligibility criteria (see Appendix B).

Validity

The validity of this qualitative study depended upon credibility, transferability, and confirmability. Birt et al. (2016) claimed that performing member checks is also an effective way of improving the credibility of the study. I relied on member checking to verify results from the first data collection phase. Member checking is a process researchers employ to improve the credibility of qualitative research (Seamon, & Gill, 2016). Researchers use member checking to improve data rigor through interviews (Birt,

Scott, Cavers, Campbell, & Walter, 2016). During the member checking phase, I

requested participants to confirm interpretations of data collected through interview.

Lincoln and Guba (1985) stated that methodological triangulation is an effective way of

improving credibility. Therefore, to assure *credibility*, I reviewed relevant practice

documents, and compared the information from the two data sources to confirm accuracy

and truthfulness in my methodological triangulation process. Polit and Beck (2010) noted

that transferability improved when the researcher provided rich and thick description of

the data collection methodology and the research findings. To improve *transferability*, I

ensured thorough discussion of data collection steps, and defined the future implications,

applicability, and findings of the study. To improve confirmability, the researcher must

reduce subjectivity of the study (Lincoln & Guba, 1985). Moreover, by addressing

researcher bias, the researcher can improve confirmability (Yin, 2017). To assure

confirmability, researchers must ensure the accuracy and neutrality of the data (Houghton

et al., 2015).

<div align="center">**Transition and Summary**</div>

In Section 2, I presented the procedures and methods selected to perform this

qualitative multiple case study. The participants for this study satisfied the following

eligibility criteria: (a) PCPs; (b) successfully implemented HIT that realized a post

implementation revenue increase of 8% within 2 calendar years; (c) observed a post-HIT

implementation improvement in year-over-year patient satisfaction measures related to

health care delivery; and (d) worked in a health care practice situated in Queens County,

New York. Participants were recruited through purposive sampling. The data sources for

this study were (a) face-to-face interviews and (b) review of relevant practice documents.

Data were analyzed using thematic analysis. The findings of the study are presented in

Section 3.

Section 3: Application to Professional Practice and Implications for Social Change

Introduction

Section 3 includes the purpose statement and a brief summary of the findings, overview of the study, presentation of findings, application to professional practice, implication for social change, recommendation for action, recommendations for further study, reflections and conclusion. The purpose of this qualitative, multiple case study was to explore successful strategies PCPs use to implement HIT to improve health care delivery and facility profitability. Data were from face-to-face interviews with six PCPs from six primary care facilities successfully using HIT for daily health care delivery in Queens County, New York. PCPs indicated that strategies they used to implement HIT successfully included providing education and training to themselves and their employees, planning ahead to meet the costs of transitioning to HIT, and persevering through challenges by focusing on expected benefits of successful HIT implementation.

Presentation of Findings

The overarching research question in this study was "What successful strategies do PCPs use to implement HIT to improve primary facility care delivery and profitability?" Three major themes emerged during data analysis to indicate the strategies PCPs used to implement HIT successfully, including (a) PCPs and their employees underwent HIT education and training, (b) PCPs planned ahead to meet costs of transitioning to HIT, and (c) PCPs persevered through challenges by focusing on expected benefits of successful HIT implementation. The following discussion is

organized into these three themes. Table 1 indicates the frequency with which these

themes were mentioned across all participants' interviews. Tables indicating frequencies

of theme components are provided in the discussion related to each theme.

Table 1

Theme Frequencies

Theme	# of times supported across all interviews
1. PCPs and their employees underwent HIT education and training	48
2. PCPs planned ahead to meet costs of transitioning to HIT	35
3. PCPs persevered through challenges by focusing on expected benefits of successful HIT implementation	22

Theme 1: Primary Care Practitioners and Their Employees Underwent Health

Information Technology Education and Training

All six participants indicated that an important strategy they used to implement

HIT successfully consisted of educating themselves (through independent research and

speaking to colleagues) and providing education and training for their employees.

Training and education for employees occurred on the job and during the transition from

paper to a HIT system. Some participants obtained education for their employees from

the vendor as part of the HIT package. When this service was not included in the cost of

the software, participants considered the education of their staff important enough that

they were willing to invest additional resources in training their employees to use HIT

effectively. Table 2 indicates the frequencies with which participants mentioned the

importance of employee and self-education as a strategy for successful HIT

implementation.

Table 2

Theme 1 Frequencies in Interviews

Education strategies	# of times mentioned across all interviews
Importance of training employees	37
Physicians' seeking information from colleagues	7
Physicians' independent research	4

P1 indicated that the training provided to employees by the HIT vendor was

essential in making implementation successful:

> I think continuous education and training was one of the tools which has brought
>
> us to this successful level. Myself as well as the company (vendor) sent in
>
> technicians to educate and train our staff. There was a classroom training and also
>
> practical or hands on training at [the vendor's site] which was so effective as well.

Similar to P1, P5 obtained effective employee-training through the HIT vendor:

> The software provider assisted us through implementation, which was so
>
> important. They assisted us from the beginning through the final stage, which
>
> really saw us through in a very successful way. So, I did not do much, but the
>
> education and the guidance that the consultant gave us was really helpful and
>
> assisted us to transition successfully.

P2 discussed why training and education were important for employees and expressed regret for not implementing more training and education during the facility's transition to HIT:

Nobody wants change. They are used to their old ways for years now, and you are bringing HIT, when some of them can't even type or they don't know how to turn on a computer. You don't know the system and are still learning how to use the system. You don't know where to put what or get what information, and everything is chaotic. Retrospectively, what I can say is we probably should have taken some more time to go through the training.

P3 also indicated that training and education for staff was a necessary part of change management and reported encouraging staff to experiment with the HIT system to gain familiarity with it:

One thing I had to do is to consistently encourage and educate my staff because you cannot have a change without any sort of change management. I kept encouraging my staff to embrace the change and open themselves to learn although it's definitely not going to be easy, it's all about their preparedness. I decided to encourage my employees, ask them to play with the system like they play with their phones to able to effectively navigate the system with ease. And I think my advice really helped to educate themselves.

P4 supported this importance of education by stating that the most important strategy for HIT implementation was:

Education, education, and education. You need to educate your staff; you need to make sure your employees understand the process you're going through. You need to make sure your staff understand the project and how it's going to roll out. You need to make staff aware, so they know what you are going through or what you are bringing on board. Overcoming challenges [associated with implementation] was based on the necessary education that we gave our employees prior to the entire project and also continuous guidance, training, and support [during and after implementation].

Further, P6 put staff through three kinds of training and education, including education in the benefits of HIT, training in how to use the HIT system, and general education about change management of educating staff about the benefits of HIT. P6 stated:

Initially some staff were very reluctant to go electronic, knowing their own weaknesses. But I believe with continued education about how important it is to go electronic and the possibility of reducing their work burden helped them get in line with our implementation. Our plan was to ensure we educate and train our staff to a level that they will understand the need for HIT, the importance of HIT. So, our staff knew what the whole project was and the importance of making it a success.

P6's staff also underwent training in basic computer skills and HIT system operation: "Not all my staff were computer literate, but with encouragement and education, they

were able to learn basic computer navigation and to use the HIT program with little or no assistance " Significantly, P6 included education for staff on general change management: "Apart from the HIT education, we also put staff through change education, how to handle change and the impact, which was very important. I think it was a great deal to have taken our staff through change management education."

Prior to implementing HIT, participants found it necessary to educate themselves, and they did this in two ways: by consulting colleagues who were familiar with HIT, and by conducting independent research. P3 said of consulting colleagues:

> If you don't know, you go to the right source, you ask questions, and those who are very good in the subject matter will be able to explain to you thoroughly how to go about it, how to start and how to end implementation.

P5 discussed the effects of consulting a more knowledgeable colleague:

> I consulted a colleague who was already using HIT. I found out from him what program they were using, and I researched a little more about the program, then I called the program developer to get more information. Eventually I decided to hop onto it.

Conversely, P1 became informed about HIT through self-education: "Nobody really told me, but I felt there was a need to start with electronic medical records." P2 also described becoming informed about HIT through independent research:

I started about 10 years ago when HIT was coming up, and we decided to invest

in it. I researched what program might be good for my practice as well as my staff

by educating my team and myself about the pros and cons of HIT.

Findings associated with Theme 1 supported previous researchers' conclusions

that adequate training for employees was important to successful implementation of HIT.

For example, Doekar and Sarnikar (2016) noted that the implementation of HIT did not

guarantee improved health care delivery and facility profitability, and success depends on

change management. The adoption of HIT is a process of implementing change in an

organization. Changes within an organization are usually associated with employee

uncertainty about how the change will affect their lives (Nilsen, Schildmeijer, Ericsson,

Seeing, & Birken, 2019). HIT adoption creates change in the organization, the work

process, and employees' attitudes. Implementation can be daunting, as HIT involves

more than just the application of technology. Therefore, it is important to acknowledge

that HIT implementation is disruptive and unsettling for many employees (Deokar &

Sarnikar, 2016; Nilsen et al., 2019), and education and training are key strategies for

transitioning successfully to HIT.

The conceptual framework for this study was general systems theory. Von

Bertalanffy's (1972) characterization of general systems theory emphasized the potential

for different parts of a system to specialize in different but complementary functions in

addition to the interrelationships resulting in behaviors and properties that exist only at

the level of the system and not at the level of individual, isolated system components.

The relevant systems in the present study are the primary care facilities of the participating PCPs. Findings indicated that the differentiation and specialization of parts of this system resulted in different staff members performing different roles and that this differentiation and specialization resulted in the need for differentiated education practices for different system participants. The PCPs who performed an administrative role in the system educated themselves through independent research and colleague consultations to determine whether HIT implementation would augment their facility's profitability and delivery of health care. When PCPs decided that HIT implementation would be advantageous, they implemented training for staff, which can involve up to three components, as suggested by P6: (a) education about the benefits of HIT, (b) training in computer skills and HIT use, and (c) education about how to manage and cope with organizational change. The desired outcomes for the system were enhanced health care delivery and increased profitability. Results associated with Theme 1 suggested that to achieve these outcomes, it was important for the PCP/administrator to educate him or herself and then for the administrator to determine the training and education needs of employees and invest in accommodating those needs.

Theme 2: Primary Care Practitioners Planned to Meet Costs of Transitioning to Health Information Technology

All six participants indicated that planning to meet the costs of implementing HIT was an important strategy for successful implementation. Costs included profits lost through temporary inefficiencies associated with the transition between systems (which

sometimes resulted in lost patients and staff), and the substantial cost of purchasing the HIT system. Participants prepared for these challenges by planning to use savings and loans to compensate for lost profits and system costs. Table 3 indicates the frequencies that participants mentioned the importance of this theme.

Table 3

Theme 2 Frequencies in Interviews

Planning for cost	# of times mentioned across all interviews
Planning for profits lost through temporary inefficiencies	15
Planning to meet HIT system cost	10

Participant 2 reported that early stages of HIT implementation were associated with temporary inefficiencies that reduced the number of patients who could be seen and that planning was necessary to use savings to compensate for lost revenue:

Remember when you start doing anything new, it takes a long time. It is scary when you do it the first time. You are possibly going to lose money when you do it the first time, because you don't know the system, you're not up to speed as before, but you catch up, so you have to prepare yourself financially to be able to pay your workers and other expenses. During first three months of HIT implementation, you might not be able to see many patients as before. But eventually within the fourth and fifth months you will catch up, because by then you know the system.

P3 described how inefficiencies associated with the early stages of HIT implementation could negatively affect a facility's profitability in the short-term:

In the beginning, HIT implementation was a little bit of a challenge. Patients had to wait longer than usual. And eventually some have to leave the office and be rescheduled, as the system could not permit us to move as fast as we used to because we were still learning to navigate, struggling to look where to press for what information. (P3)

P6 also reported that patients frustrated by long waits might leave the practice altogether: "I permanently lost some patients who thought there was no need for them to go home with their ailments and come back the next day just because we could not attend to them during the [HIT] implementation." P5 reported that implementing HIT could also result in lost employees whose replacements needed to be trained, resulting in further costs:

I had to let some employees go who were not computer savvy or were not literate in computing, and I had to replace them with people who were able to use the computers and then train [the replacements] to boost the efficiency and effectiveness of the handling of this system.

Based on these responses, it is important to plan for losses during implementation. For example, P6 expressed the importance of planning to compensate for lost profits associated with temporary inefficiencies during implementation:

I think having a planned strategy to handle the implementation is significant and

the basis of a successful implementation. I had to secure a loan to facilitate the

project because I knew, and I was also informed by the software provider, that I

may not be able to see patients like I used to in the course of the implementation.

So, I decided to have some money in the bank to take care of my expenses and

other unforeseen challenges.

Participants reported that the most significant challenge associated with HIT

implementation was the cost of the system itself and suggested that this cost might deter

PCPs from implementing HIT. P3, for example, postponed HIT implementation for years

as a result of inability to pay the high initial cost of the system. P1 referred to the cost of

the HIT system as the first challenge of implementation:

The first [hurdle associated with HIT implementation] is the system's cost. It can

be expensive, and the margins in private practice are very small. Although the

amount involved wasn't pleasant, I needed to do it because of the trend of the

industry. (P1)

P3 also described the HIT system's cost as the first challenge in implementation:

First of all, going into this program in the beginning was a challenge because of

money. Initially it was difficult to procure the program, as it was expensive, and

financing it was a little bit difficult, although I knew in advance how much it was

going to cost me because the consultant gave me a quote. (P3)

P2 postponed HIT implementation in the hope that the cost of the software application would go down:

So, the first attempt I made to purchase HIT was with a company which was creating mine for me at a cost of $25,000. I saw HIT was the way forward, but I advised myself to wait a little, because probably the price would be reduced, and indeed it was. (P2)

P6 discussed why it was important to plan to meet the cost of the HIT system:

There is a saying that failing to plan is planning to fail. I didn't want to lose the money invested and needed to ensure that I together with my organization came out successfully. I think before any practitioner decides to employ HIT in his or her practice, they should plan carefully by taking into consideration employees, patients, the duration of the project, the impact it will have on the practice both short and long-term, and how to handle the financial burden and the general wellbeing of the organization. (P6)

Participants' reports of the high costs associated with HIT implementation supported the findings of previous researchers. Zulman (2015) found that many PCPs in the United States face financial difficulties in their attempts to cover the costs of HIT implementation. Other researchers have concluded that small health care facilities often have to cope with a lack of funds when adopting HIT to provide quality patient care and remain competitive in the health care industry (Burgdorfer & Simnick, 2016). According to Couchoro (2016), the major barriers to the implementation of HIT are time and

financial constraints, because the complex nature of HIT implementation makes it challenging to complete in a short period. Additionally, as participants in the present study reported, a lack of skilled personnel can further prolong the process of HIT implementation and increase costs associated with temporary inefficiencies (Klersy et al., 2016; Martin et al., 2016). Fragidis and Chatzoglou (2018) concluded that adequate financial resources and skilled personnel are essential to successful HIT implementation.

In describing general systems theory, the conceptual framework for this study, von Bertalanffy (1937) emphasized the importance of interactions between differentiated and specialized parts of a system in producing emergent system properties and behaviors that cannot be attributed to any of the system components in isolation. Results in the present study associated with Theme 2 indicated that in the relevant systems (i.e., participants' PC facilities), accomplishing the transition to an emergent property of increased efficiency through HIT implementation required adjustments to all parts of the system. Thus, although findings in this study confirmed that the interrelationships among the components of PC facility systems resulted in emergent qualities such as profitability and delivery of patient care, transforming the efficiency with which these outcomes were achieved required radical, system-wide changes. These changes were, in turn, associated with a substantial investment of resources, and participants needed to plan well in advance to meet implementation costs.

Theme 3: Primary Care Practitioners Persevered by Focusing on Expected Benefits of Successful Health Information Technology Implementation

All six PCPs reported that they needed perseverance to overcome the challenges of HIT implementation, just as they needed to plan to meet implementation costs. Participants further reported that they sustained their perseverance by keeping their focus on the business-practice benefits of successful HIT implementation. The expected overall benefits included enhanced health care delivery and increased profitability. Direct benefits that contributed to these outcomes included more efficient performance of routine office tasks through increased efficiency in the storage, organization, and retrieval of records; reduced burden on staff through patient self-help, and; reduced time demands on patients through more efficient services. Table 4 indicates the frequency components of Theme 3 across all interviews.

Table 4

Theme 3 Frequencies in Interviews

Theme component	# of times mentioned across all interviews
PCPs need commitment and perseverance to overcome HIT implementation challenges	6
Focusing on HIT's expected benefits can sustain PCPs' perseverance	4
Realized benefit of efficient performance of routine office tasks through increased efficiency in the storage, organization, and retrieval of records	5
Realized benefit of reduced time demands on patients through more efficient services	4
Realized benefit of reduced burden on staff through patient self-help	3

Primary care practitioners need commitment and perseverance to overcome health information technology implementation challenges. P3 described perseverance as essential for successful implementation:

> There are so many challenges to implementation that one might not anticipate going through, but with determination and perseverance you will be able accomplish your goal. It's all about your commitment. It's all about your well preparedness to move forward. Once you are ready and determined to go through you will eventually come out successfully. And I believe perseverance was one of our anchors which made me and my staff successful in implementing this new HIT system. (P3)

> P4expressed a perception similar to P3's regarding the importance of commitment

and perseverance/determination for successful implementation: "I believe determination and commitment were key, we wouldn't have come this far without determination and commitment. So, I believe although it was a struggle, we made it through to this point because of determination." P6 expressed that perseverance/determination and commitment helped in overcoming challenges:

> The challenges were of different kinds, but I was so committed and determined to make the change to HIT. I embark on every project very determined and committed. Before I embarked on this project, there were so my things I considered and also put in place to pave the way for a successful beginning.

Although it wasn't simple, I kept to my promise of ensuring a successful

implementation and making HIT a working tool in my practice. (P6)

Focusing on health information technology's expected benefits can sustain

primary care practitioners' perseverance. P2 developed an appreciation for the

benefits of HIT when the technology was first beginning to emerge, and focusing on

these benefits helped in persevering through challenges associated with implementation:

You have to look beyond challenges and see the opportunities. You need to have

an open mind. And again, looking into the possible opportunities. When HIT was

emerging as a new technological solution, some of us (PCPs) saw that this is the

way to go. Because the paperwork (record-keeping) was a lot of work. We saw

that HIT was the future and therefore something good to invest in. So, I decided

to jump in until it catches on. (P2)

An appreciation of HIT's benefits motivated P3 to champion the system to employees

and persevere despite setbacks:

To be successful in adopting HIT, one needs to continuously encourage

employees to keep moving forward. If you are determined to go through with it,

the challenges will be a thing of the past. So, I educated my employees, I

encouraged them, and I kept having one on one conversations with them for them

not to lose the hope that eventually they are going to know how to manipulate and

effectively use the system. (P3)

P1 spoke of how an appreciation of the benefits of HIT motivated the overcoming of challenges encountered during implementation:

> HIT implementation was difficult, but I was determined to learn, and because it is my practice, I needed to make it work. Now I can look back and say I made the right choice, patients are happy, they spend less time registering to be seen, and they are able to access their medical records wherever they have internet connectivity. Whether you are implementing HIT on your own or you are joining a bigger organization, it's all about perseverance and commitment. (P1)

Primary care practitioners' personnel realized the expected benefits of health information technology implementation. P4 described how HIT had increased the efficiency with which routine tasks were completed through HIT's increased efficiency in the storage, organization, and retrieval of records:

> Today we are able to access all our files electronically with a click of a mouse we are able to get the patient's information. We don't need to go through all the files looking for records. We are able to handle almost everything online. So, I believe that post-implementation efficiency improvement has been excellent, and I believe it has reduced the time used in looking for files and results here and there in a cabinet or drawer. (P4)

P2described HIT as increasing efficiency in the office overall, and as reducing the time burden on patients, typically cutting the time required for a visit in half:

> Pre-HIT implementation, patients would be here for about 2 hours. Post-HIT implementation, everybody knows what they are doing, what icon to press for what information or where to enter necessary information. A patient can walk into my office and in an hour will be out with everything moving smoothly. (P2)

P5 also spoke of increased efficiency in routine office tasks and reduced time burden on patients:

> Post HIT implementation, so many things have changed. Patients are able to access their documents from home on the Internet, so patients do not have to call the office when they need or have questions about their records. We are able to email prescriptions directly to the pharmacy, so the medication is ready when the patient arrives at the pharmacy. HIT reduces the time patients spend in our office and has also reduced the time spent looking in files for patient information. (P5)

> P6 described ways in which HIT increased overall efficiency, thereby reducing

burdens on staff and patients, and how the business outcome for the practice has been a marked increase in the number of patients served:

> Our patient population increased dramatically after the implementation and normalization of our process with HIT. In fact, there are a lot of tasks that we used to handle manually which had always been a problem, but with HIT implementation, we have been able to do away with those challenges in our operation. Sometimes patients schedule an appointment and are unable to make it, and when they call the front desk, as humans, staff sometimes forget to update the

appointment list. We could have used that appointment slot, but once the receiving staff forgets to update the list or updates it incorrectly, this affects the next day's operations by leaving empty appointment slots. But with HIT, the system does everything, including appointment scheduling, rescheduling, cancellation, etc. (P6)

P6 elaborated on this description of the business-practice benefits of HIT by further discussing the outcome of increased patient enrollment at the practice:

Based on our patient registration figures, we saw a drastic change, we started serving greater numbers of patients than before. I wasn't surprised, as we were able to see and discharge patients within no time after HIT implementation. All my patients had to do is to register in the system once, and all their information can be accessed in seconds whenever they visit to see a doctor. (P6)

Participants' descriptions of the benefits of HIT supported the conclusions of previous researchers. Amante (2015) and Wu, Rundall, Shortell, and Bloom (2016) found that HIT can improve primary health care services' accessibility, accuracy, reliability, and efficiency. Lee and Choi (2016) concluded that widespread use of HIT within the primary care industry has the potential to increase administrative efficiency, reduce paperwork, and increase a practice's revenue by as much as 8%, while improving health care quality.

Despite these benefits of HIT for PCPs, their employees, and their patients, many primary care facilities have not yet adopted HIT (Lee & Choi, 2016; Payne et al., 2016).

Researchers have found that failure to implement HIT is often associated with a lack of support from medical, nursing, and administrative staff, and that commitment and involvement of leaders in the HIT implementation process is the most significant success factor (Fragidis & Chatzoglou, 2018). Fragidis and Chatzoglou's results indicated that commitment from staff and PCPs themselves is vital to the success of HIT implementation. Accordingly, Kontos (2014) recommended that communication efforts to persuade PCPs to implement HIT should focus on cultivating their commitment by highlighting the differential benefits facilities can accrue through successful HIT implementation.

In the present study, participants reported that their appreciation of the benefits of HIT motivated them to persevere through implementation challenges. This finding, taken in conjunction with previous researchers' findings that commitment and buy-in on the part of leaders and staff are important success factors (Fragidis & Chatzoglou, 2018; Lee & Choi, 2016; Payne et al., 2016), indicated that PCPs' developing an appreciation of and maintaining a focus on HIT's benefits was a critical strategy for successful implementation.

General systems theory indicates the structure and properties of systems in terms of internal relationships, through which a system as a whole can acquire emergent properties and behaviors that are not inherent in any of its parts (von Bertalanffy, 1972). In the present study, the relevant system is the individual primary care facility. Findings associated with Theme 3 have highlighted the interdependence of the elements of that

system, by indicating that relationships between physicians, staff, patients, and HIT can result in an increased efficiency that cannot be attributed to any subset of the components in isolation. Findings from the previous literature have indicated that failure of any part of the system to cooperate with any of the other parts can prevent the emergence of increased efficiency.

Application to Professional Practice

The general business problem in this study was that adoption of HIT in primary care facilities can be slow and challenging. The specific business problem was that some PCPs lack successful strategies to implement HIT to improve health care delivery and increase profitability. Findings in this study have significant applications to professional practice that are relevant to PCPs and to vendors of HIT applications.

The first strategy that is applicable to professional practice is that of providing education and training to PCPs and their employees. This strategy may be used to meet challenges identified by previous researchers, including employee uncertainty and resistance (Nilsen et al., 2019), lack of commitment on the part of staff and the PCPs themselves (Fragidis & Chatzoglou, 2018; Lee & Choi, 2016; Payne et al., 2016), and costly inefficiencies associated with inadequate computer skills and HIT system literacy among employees (Klersy et al., 2016; Martin et al., 2016). Optimal training and education for employees can include three components: education in the importance and benefits of HIT for patients and the employees themselves, training in how to use HIT and (if necessary) how to use computers, and education in managing and coping with

organizational change. Optimal education for PCPs may include consulting colleagues who are more experienced with HIT, and independent research.

The second strategy was planning ahead to meet the costs of transitioning to HIT. This strategy can be used to meet challenge of the high cost of HIT implementation, which include the initial cost of the HIT system and profits lost through temporary inefficiencies associated with the early stages of implementation (see Burgdorfer & Simnick, 2016; Klersy et al., 2016; Martin et al., 2016; Zulman, 2015). Planning to meet implementation costs can include dedicating savings to meet expenses, taking loans, and consulting with HIT vendors and other physicians to estimate the amount of funding needed.

The third strategy was persevering through challenges by focusing on expected benefits of successful HIT implementation. Previous researchers and participants in this study have noted that significant challenges to HIT implementation included lack of commitment on the part of staff and the PCPs themselves (see Fragidis & Chatzoglou, 2018; Lee & Choi, 2016; Payne et al., 2016). Fragidis and Chatzoglou found that facility leaders' commitment to and involvement in HIT implementation was the most important success factor. To maintain a high level of commitment and persevere in spite of significant frustrations and challenges, participants in the present study reported that they needed to maintain a focus (both for themselves and their employees) on the expected benefits of successful HIT implementation. Expected overall outcomes included improved health care delivery and increased profitability. Direct benefits of HIT

implementation that allowed participants' facilities to achieve these outcomes included:
more efficient performance of routine office tasks through increased efficiency in the
storage, organization, and retrieval of records; reduced burden on staff through patient
self-help, and; reduced time demands on patients through more efficient services.

Implications for Social Change

As discussed in Chapters 1 and 2, adoption of HIT by PCPs has the potential to
improve health care cost efficiency through waste avoidance and supporting the delivery
of accurate and timely health care to all patients (Hu, Ong, Zhu, Liu, & Song, 2015).
Health care professionals' adoption of HIT can also facilitate care coordination through
increased responsiveness, efficiency, security, privacy, and accuracy, as well as support
better communication and error reduction (Sensmeier, 2014). The strategies identified in
the present study can contribute to positive social change by assisting PCPs in achieving
these improved health care outcomes for patients through successful HIT adoption. Thus,
if PCPs provide education and training to themselves and their employees, plan ahead to
meet the costs of transitioning to HIT and persevere through challenges by focusing on
expected benefits of successful HIT implementation, positive, long-term social change in
the form of improved health care may be realized through increased HIT implementation
among PCPs.

Recommendations for Action

PCPs who might wish to implement HIT in their facilities and HIT vendors who
wish to coach potential and current customers through a smooth transition into effective

use of their services, should pay attention to the following recommendations for action.

These recommendations and the findings may be communicated to practitioners through

professional listservs and mailing lists, presentations and pamphlet distribution at

professional conferences, and publications in professional journals.

     The first recommendation for action is that PCPs become informed about the

benefits of successful HIT implementation, including improved care delivery and

increased profitability. PCPs can become informed about HIT by conducting independent

research, and by consulting with more knowledgeable colleagues. PCPs are advised to

acquire an independent knowledge base about HIT before consulting with vendors, so

they can achieve a foundational perspective on HIT that is not biased in favor of a

specific HIT solution.

     The second recommendation for action is that PCPs delay HIT implementation

until they feel they have achieved a durable conviction that HIT will benefit their facility

and patients in the long-term. Short-term challenges associated with HIT are significant,

and perseverance in spite of these challenges requires a high level of commitment based

on a clear perception of and belief in expected long-term benefits. If the PCP begins the

transition to HIT without feeling completely convinced of the long-term benefits, short-

term costs and frustrations may deter the PCP from persevering and result in the loss of a

substantial investment.

     The third recommendation for action is that PCPs should provide thorough and

effective training and education for their staff. Ideally, provision of training would be

preceded by a candid determination of staff's educational and training needs with respect
to HIT implementation. If staff do not to support implementation, formal education in the
benefits of HIT to patients, the facility as a whole, and staff themselves may be
appropriate. If staff lack the necessary computer literacy, remedial training may be
appropriate. If staff are reluctant to implement HIT not because they doubt HIT's
benefits, but because they are resistant to change, education in managing and coping with
change may be appropriate. Lastly, staff will need thorough, ongoing, hands-on training
in how to use the HIT system the PCP decides to implement.

The fourth recommendation for action is that PCPs engage in thorough financial
planning and preparation before beginning to implement HIT. The planning process
should first involve estimating the cost of the HIT system and the amount of profits likely
to be lost through short-term inefficiencies associated with implementation. System cost
can be estimated by soliciting quotes from vendors. Lost profits may be estimated
through consultations with more knowledgeable colleagues and comparison of
independent research findings on expected inefficiencies to knowledge of personnel and
operations parameters in the PCP's own facility. Next, financial planning and preparation
should involve sequestering a sufficient amount of savings, and/or obtaining sufficient
loans, to meet the estimated costs.

Recommendations for Further Research

Limitations in this study included its small sample size. These limitations may be
addressed in future research using larger and different samples, and in future replications

of this study's procedures. The study's delimitation to PCPs in Queens, New York, who successfully implemented HIT is likely to limit the transferability of the findings to other populations and samples. Transferability of the findings may be enhanced by conducting similar studies using different populations (e.g. administrators of large medical facilities, PCPs who tried and failed to implement HIT, or PCPs in other geographic areas) to determine if the findings in this study are consistent with results obtained in different research contexts. It is also recommended that findings in this study be tested in future quantitative research involving a sample size large enough to allow generalizability.

Reflections

I began this study with background knowledge of the benefits of HIT implementation for PCPs and their patients. I read literature indicating that PCPs who use HIT platforms can enhance patient engagement and improve health care outcomes, because patients become more empowered in addressing their own health concerns. I also read that patients empowered by information access are more trusting of their primary care practitioner and the broader health care system. However, my research also made me aware that many PCPs have not implemented HIT, and that PCPs' reasons for declining to adopt HIT were not well understood.

Given the substantial benefits of HIT for all stakeholders and given the apparent ease with which PCPs and staffs who were experienced with HIT were able to use the platform, it was difficult for me to understand why PCPs might decline to implement HIT. Personal reflection revealed that I brought a bias to this research, in that I was

disapproving of PCPs who did not implement HIT and considered their resistance arbitrary. I entered into the conduct of this study by working to suspend this bias through active reflection and mindfulness, although it would not have influenced my perceptions of the study participants, and this bias was not relevant to my study purpose or findings. I found, however, that my interviews with participants soon eliminated my feelings of disapproval of PCPs who would not implement HIT for their own benefit and for the benefit of their patients.

The aspect of participants' responses that changed my perception was their characterization of the seriousness of the challenges they faced in trying to implement HIT. This study's sample consisted of practitioners who succeeded in implementing HIT, but even they spoke emphatically of the difficulties they needed to overcome to realize HIT's benefits. I was not fully cognizant of the great expenses involved, or of how narrow the profit margins for PC facilities often were. I also did not expect that employees might be so resistant to the change or might require so much training and preparation to use HIT successfully. Lastly, I did not expect that short-term inefficiencies might be temporarily detrimental to patient case, a factor likely to deter doctors who are invested in providing a high quality of health care.

My investigation affirmed my commitment to this research and my belief in its importance. There are good reasons why many PCPs do not implement HIT. Their lack of strategies for successfully overcoming the significant challenges they will encounter may make the refusal to implement HIT a prudent decision for practitioners who have

limited resources and unprepared personnel. For these reasons, it is critical that PCPs be acquainted with evidence-based strategies that will ease their implementation of HIT. PCPs' use of these strategies may assist them in securing the benefits of HIT for themselves, their staffs, and their patients.

Conclusion

PCPs' implementation of HIT in their facilities has the potential to improve health care delivery and increase profitability, leading to benefits for patients, facility staff, and the PCPs themselves. However, there are significant challenges associated with HIT implementation, and previous researchers have not provided PCPs with strategies for ensuring the benefits of successful HIT implementation are realized. Findings in this study indicated that successful strategies for HIT implementation included providing education and training to themselves and their employees, planning ahead to meet the costs of transitioning to HIT, and persevering through challenges by focusing on expected benefits of successful HIT implementation. Use of these strategies may make HIT implementation more feasible for some PCPs, with the result that the benefits of HIT are made available to more patients and practitioners.

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Appendix A: Interview Protocol

I. Commence by introducing the research study and myself. I will go over the eligibility criteria with the participants again as follows:

(a) 18 years or older

(b) Be an owner-practitioner of a primary care practice.

(c) Acts as the facility's chief decision maker.

(d) Have prior successful experience in HIT implementation.

(e) Be able to provide substantial insight into the questions.

(g) Participant signed the required informed consent.

II. Review consent form with participant and answer any question that may arise.

III. I will let participant know my intention of audio recording the interview for accuracy.

IV. I will start recording by noting the date and time.

V. Introduce participants with coded identification to protect their privacy.

VI. Begin interview with question #1; follow through to the final question.

VII. Discuss member checking procedure with participants after the end of the meeting.

VIII. Verify their contact information.

IX. Thank them for their time.

X. End protocol.

Appendix B: Participant Eligibility Criteria

I	Demographic Information Section:		
1	Participant's name:	2	Participant's pseudonym:
3	Interview date:	4	Start time: End time:
5	Sex of participant: M □ F□		
6	Participant's title:	7	Participant's company:
8	Time with current organization	Years:	Months:
9	Time with HIT implementation(s)	Years:	Months:
II	Participant Eligibility Criteria Section:		
1	Are you a primary care practitioner? Yes □ No □		
2	Have you successfully implemented HIT that realized a post implementation revenue increase of 8% within two calendar years? Yes □ No □		
3	Have you observed a post-HIT implementation improvement in year-over-year patient satisfaction measures related to health care delivery? Yes □ No □		
4	Is your health care practice situated in Queens County, New York? Yes □ No □		